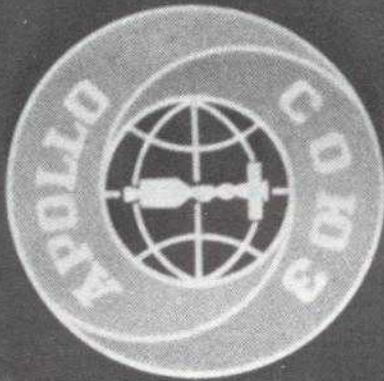


July-August 1975
Vol. X, No. 4

COMSAT NEWS

FILE COPY - NOT FOR CIRCULATION



NBC NEWS



Late News

Fund-raising comedian gets assist from satellites

The image of master comedian Jerry Lewis literally leapt oceans during his record-setting drive for funds to help those affected by Muscular Dystrophy. His appeal for help for those who could not help themselves traveled at the speed of light over satellites poised above the Atlantic and Pacific Oceans into the living rooms of sympathetic viewers in Hawaii and Puerto Rico.

From Las Vegas the tireless humanitarian's drive for funds reached out from California over the Pacific INTELSAT IV (F-8) through COMSAT's Paumalu Earth Station to Honolulu's KGMB-TV. Reaching New York, the familiar outstretched hand crossed part

of the Atlantic Ocean via the Atlantic INTELSAT IV (F-7), entering Puerto Rico by way of COMSAT's Cayey Earth Station and Station WAPA-TV in San Juan.

The Telethon lasted approximately 20 hours and 30 minutes. The satellite system transmitted 10 hours and 21 minutes to Hawaii and six hours and 15 minutes to Puerto Rico.

Did satellites help? Robert Conside, an executive producer with the Muscular Dystrophy Association, said, "The Telethon got a great response from Hawaii and Puerto Rico."

And the Telethon? It raised more than \$18 million, an all-time high.

News in Brief

COMSAT/COMSAT General reorganization

Reorganization within COMSAT and COMSAT General results in new Vice Presidents and Assistant VP's and structural changes.

Governors approve INTELSAT V RFP

Sixteenth Meeting of Governors authorizes INTELSAT V RFP and designates IV-A (F-1) to be Atlantic primary satellite.

Caruso resigns, replaced by Latapie

Andrea Caruso resigns as Director of Administration and Conference Affairs for INTELSAT. Pierre Latapie, veteran in INTELSAT matters, named as replacement.

Sampson retires

Concluding four decades of work in communications, General Sampson calls it quits and heads for Florida.

Labs propagation experiment goes international

Western Europe and India request services of Labs-built transponder carried on ATS-6 to conduct propagation experiments.

Office directors change

Miles Merians assumes directorship of Singapore Office to replace Roman I. Ulans, assigned Director of the European Office in Geneva.

New manager for Etam

William L. Miller, former Manager of the Earth Segment Program Office, new head of Etam Earth Station.

Exhibits and demonstrations

Echo Suppressor and Echo Cancellor demonstrated at ICC exhibit in San Francisco, DIGISAT service shown to attendees at the AFCEA Convention in Washington, and COMSAT exhibit displayed at D.C. Convention of NAACP.

Special Features

Apollo-Soyuz Mission, A post-flight report:

An Era Ends at the Cape, by Larry G. Hastings

The Launches, the Union in Space, the Landings, by John J. Peterson

Raisting, A Link Between Two Worlds, by Johannes Adolphs

Labs Closeup, by Shirley Taylor

Personnel Question Box

Cover: NBC Anchorman Jim Hart with guest commentators Astronauts Alan B. Shepard, seated at right, and Jack R. Lousma, standing, focus on a monitor as they wait to go on the air in the network's temporary studio on the third floor of the Mission Control Center in Houston. Behind them, on the large screen, the live telecast of the exchange of gifts and mementos comes into the studio over an Atlantic Ocean INTELSAT IV and through the Andover Earth Station on its way to Houston. The network broadcast live from the converted alternate Control Center during the mission of Apollo-Soyuz. Photo By John Peterson.

July-August 1975

COMSAT NEWS is published bi-monthly by the Public Information Office, Communications Satellite Corporation, COMSAT Building, 950 L'Enfant Plaza, S.W., Washington, D.C. 20024. Phone 554-6104.

Robert B. Schwartz, Secretary and Director of Public Information

Stephen D. Smoke, Manager, Publications

John J. Peterson, Editor

Edgar Bolen, Production

A Member of the International Association of Business Communicators.

Vol. X, No. 4

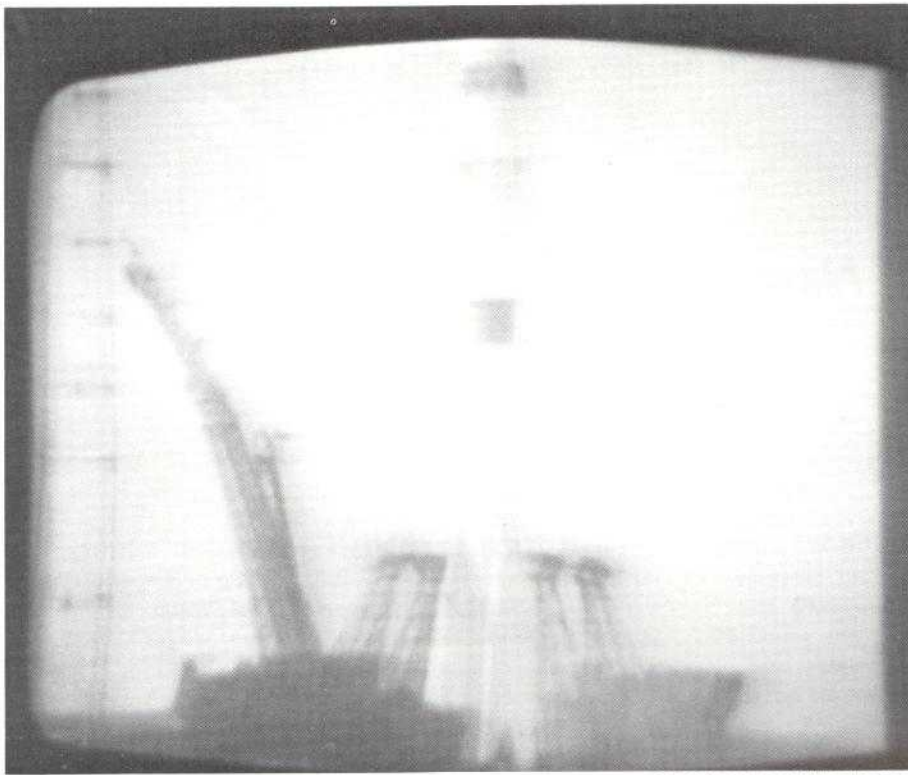


PHOTO BY DONALD FIFIELD

Taken from TV monitors at the Andover, Maine, earth station the Soyuz spacecraft stands poised for launch at the Soviet Baikonur Cosmodrome.

A mixture of joy and sadness

ing areas for 9,900 cars and 400 motor homes and buses. The bleacher seating at the VIP site could accommodate 4,000 persons. (Presumably then, 66,000 people would be standing all over the Cape area, suggesting 132,000 sore feet—unless of course, they brought along folding chairs). At the Visitors Information Center, COMSAT's permanent exhibit received a lot of attention.

News media attendance heavy, too

NASA Information Officers had predicted that attendance by news media representatives from both the print and electronic journalism fields would be almost as great as during Apollo 11, the first lunar flight six years before. To their credit, the prediction was quite accurate. At the close of business on July 14—the day before the launch—2,017 news media representatives had been signed in by the APOLLO-SOYUZ News Center at Cocoa Beach.

They came from all over the world: London, Sweden, Japan, Yugoslavia, Peru, Australia, Spain, France, Germany, Canada, Switzerland, Ivory Coast, Italy, and many other countries. Some publications with odd-

(continued on page 23)

Some of the more than 2,000 accredited newsmen gather at the viewing stand to await the launch of Apollo.

An era ends at the Cape;

by LARRY G. HASTINGS

The APOLLO-SOYUZ launch which took place on Tuesday, July 15, was the last gasp of the manned spaceflight program for the next four or five years. Spacewatchers from across the nation, aware of this one last chance to witness such a dramatic event, and to be present at the creation of a bit of history, started pouring into motels and camp sites in ever-increasing numbers starting on Saturday before the launch. Major motels and hotels had "no vacancy" signs out that day, in spite of inflated rates and a three-day minimum requirement.

No evidence of depression here. As many as a million persons were expected to clog highways in and around the Kennedy Space Center that launch day. But the launch area had been suffering along with the entire east coast of the U.S. under a prolonged siege of heavy rain and storms.

Mr. Hastings is a COMSAT Senior Information Officer.

Huge crowds expected

NASA had invited about 70 thousand guests ranging from legislators and foreign diplomats to movie stars, and felt certain that almost all invitees would accept. On the final lunar flight—Apollo 17—over 53 thousand persons had attended. Anticipating the larger crowds, NASA set aside five park-



Apollo-Soyuz

the launches, the union in space, the landings;
all televised by satellite

STORY AND PHOTOS BY
JOHN J. PETERSON

In addition to the vast expanse of land and water separating the peoples of North America from those of the Soviet Union, there are differences in customs, cultures, religions, languages and forms of government.

But, beginning at 8:20 EDT on the morning of Tuesday, July 15, these differences were laid aside as the SOYUZ spacecraft rocketed away from the Baikonur Cosmodrome in Central Asia, some 2,000 miles southeast of Moscow, carrying its two Cosmonauts on a trajectory scheduled to take it to a point in space to be joined by another space vehicle of another country.

Seven and a half hours later, some 10,000 miles across the world, APOLLO, with its three-man crew, lifted off from the Kennedy Space Center and headed for the same point in space as the SOYUZ. They would meet three minutes ahead of schedule at 12:12 p.m. EDT, approximately 140 miles over the Atlantic Ocean west of Portugal.

Although the major objective of the APOLLO-SOYUZ Test Project (ASTP) was to prove that a jointly-designed, international docking mechanism could mate the spacecraft of the world's two leading space powers, and that men and machines could work together, a communications network capable of tying men, machines and countries together was the key to attaining this objective.

The INTELSAT global satellite system, managed by COMSAT, provided links in the chain constituting the vast NASA communications network supporting the mission and was the means by which live, televised segments of the joint venture were returned to earth for commercial distribution to a worldwide audience estimated in the hundreds of millions.

Watching the 25-foot, seven-ton spacecraft gather strength and momentum as it lifted from its Baikonur

launch pad atop its three-stage, nearly 300-ton, launch vehicle from the third floor viewing room of the Mission Control Center in Houston, one couldn't help but reflect on the impact the space program and communications satellites had had on bringing the people of the world closer together. The live, televised launch appearing on the large screen in the Control Center was happening just a fraction of a second in time away on the other side of the world.

Open Reporting Evolves

At 9:34 a.m. on May 5, 1961, about 45 million Americans sat tensely before their television screens and watched the slim, black-and-white Redstone booster, capped with a MERCURY spacecraft manned by Astronaut Alan B. Shepard, Jr., go roaring into the sky on its suborbital flight.

FREEDOM 7 was America's first manned venture into space. The flight lasted 15 minutes and 22 seconds. Shepard had reached an altitude of 116.5 miles, attained a maximum speed of 5,180 miles per hour and landed 302 miles down range from Cape Canaveral.

Although overshadowed by the previous flight of Soviet Cosmonaut Yuri Gagarin, Shepard's flight was considered a landmark in open media reporting. Whereas Gagarin's flight had been reported only through official Soviet news media, the flight of FREEDOM 7 was there for all to see. Newsmen gathered from all parts of the world, excepting Iron Curtain countries, to report by wire and telephone America's entry into the "space race."

COMSAT was on the drawing board and came into being more than a year

(continued on page 25)

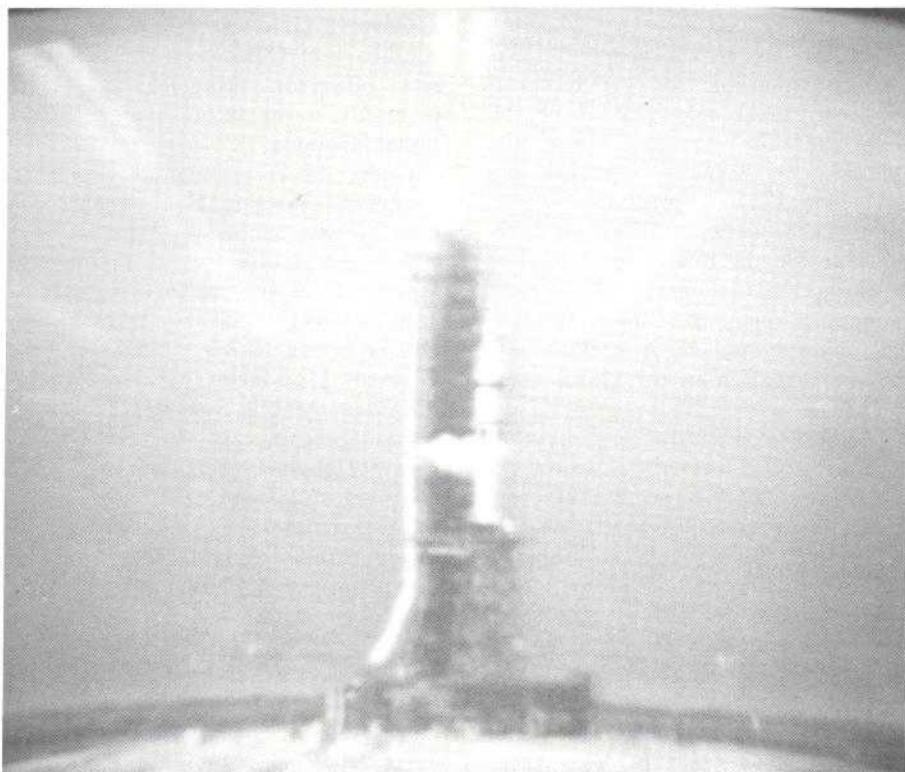


PHOTO BY DONALD FIFIELD

Seven-and-one-half hours later Apollo was ready to lift off for its rendezvous in space.

*Mr. Peterson is Editor of The
COMSAT NEWS.*

Major corporate reorganization announced

COMSAT Directors elect new VP's and Asst. VP's.

The Board of Directors of COMSAT has elected three new Vice Presidents and three new Assistant Vice Presidents in a reorganization relating in part to COMSAT's activities as a major user of the INTELSAT global satellite system, and as the provider of technical and operational management services to INTELSAT.

The new Vice Presidents are: William H. Berman, formerly General Counsel, now Vice President and General Counsel; Martin J. Votaw, formerly Assistant Vice President-Engineering, now Vice President in charge of a new division, the INTELSAT Management Division; and H. William Wood, formerly Assistant Vice President for International System Operations, now Vice President in charge of another new division, the U.S. INTELSAT Division.

The INTELSAT Management Division is responsible for the technical and operational management of the global satellite system under the Management Services Contract between INTELSAT and COMSAT.

The U. S. INTELSAT Division is responsible for the provision of services to COMSAT's customers for overseas communications, the operation of U.S. international earth stations, and U.S. participation in the global satellite system.

The functions of the new divisions described above formerly were the responsibilities of George P. Sampson, Senior Vice President (retired).

The new Assistant Vice Presidents are: Eugene T. Jilg, formerly Director of Space Segment Engineering, now Assistant Vice President, Engineering, in the Research and Engineering Division; James B. Potts, formerly Director, Earth Station Engineering, now Assistant Vice President, Communications Operations, in the INTELSAT Management Division; and Carl J. Reber, formerly Director

of Financial Analysis, now Assistant Vice President, Financial Administration, in COMSAT's Finance Division.

In other changes, Richard R. Colino, formerly an Assistant Vice President in Corporate Affairs, who serves as the U.S. Governor in INTELSAT, has become Assistant Vice President in the U.S. INTELSAT Division and continues as U.S. Governor;

corporate-wide procurement services, directed by Lewis C. Meyer, an Assistant Vice President, has been transferred under Mr. Meyer to the Research and Engineering Division; and Donald E. Greer, Headquarters Executive Officer, has been given the additional responsibility of Director of General Services.

COMSAT GENERAL designates Owen VP, strengthens E&D

COMSAT GENERAL Corporation, the subsidiary of COMSAT, has named four new officers in a reorganization related primarily to its technical and operational functions.

Under the reorganization, the Vice President, Systems Engineering and Development, John L. Martin, Jr., will be responsible for the engineering aspects of all systems owned or managed by COMSAT GENERAL. New officers reporting to Mr. Martin will be Edward J. Martin, Assistant Vice President, Mobile Systems; Robert D. Briskman, Assistant Vice President, Fixed Systems; and Robert C. Barthle, Assistant Vice President, Ground Systems.

The Ground Systems Office will be established by transferring to that office from the present Office of Technical Services the Managers and staffs of Advisory Services and Project Engineering; from the present Office of Mobile Systems the Assistant Program Manager, Communication Terminals, and his staff excluding the Director, Ship Terminal Implementation and Service, and his staff; and

from the Office of Domestic Systems the Senior Communication Transmission Engineer and the Earth Segment Engineer.

The Office of Mobile Systems will consist of all personnel presently in the office except personnel being transferred to Operations and Ground Systems. The Fixed Systems Office will consist of all personnel of the present office except for those being transferred to Ground Systems.

Designated Vice President, Operations, Donald R. Owen will be responsible for the operation and maintenance of all satellite communications systems owned or managed by COMSAT GENERAL. Mr. Owen will direct the activities of Domestic Operations headed by Harry G. Gross, Overseas Operations under the direction of Paul M. Winchester, and Maritime Operations under Charles Dorian.

Included in the reorganization is the establishment of the Office of Public Affairs to be headed by Hale Montgomery with James H. Kilcoyne transferred to that office.

COMSAT Propagation Experiment goes international

BY GEOFFREY HYDE

The ATS-6, 13/18-GHz COMSAT Propagation Experiment Transponder is on the road to Zanzibar. After a successful engagement 20,000 miles over the Galapagos Islands, the ATS-6 satellite will be featured in a new location over Tanzania. The COMSAT Propagation Experiment Transponder, CPE, (see COMSAT NEWS, March-April 1975) which has functioned flawlessly for the duration of the American experiment will now perform for an international audience, in Western Europe and India.

The success of the COMSAT experiment during 1974 in the eastern United States led to the request to NASA from ESRO (European Space Research Organization), together with several European research facilities and from ISRO (Indian Space Research Organization) to use the facilities of this experiment in their countries to collect propagation data. Present

plans are for nine dual frequency (13 and 18 GHz) and four single frequency (18 GHz only) ground transmit terminals (GTT's) in Europe, and three dual frequency and two single frequency GTT's in India. The receive terminal and data acquisition system for all experimenters will be run by CTNE (the Spanish participant in INTELSAT) for ESRO/ESTEC at Buitrago, Spain. Twelve hours daily, the ATS-6 satellite will point the experiment to Europe, and twelve to India.

COMSAT has trained the experimenters, supported the transfer and installation of equipment, and the initiation of the CPE, and will process the resulting data for ESRO/ESTEC and its partners from the United Kingdom (University of Essex, University of Bradford and Appleton Laboratories), Germany (Deutsches Bundespost), Spain (CTNE), Italy (Telespazio and Polytechnia di Milano), Holland

(Technical University at Eindhoven) and Austria (Technical University at Graz). The first step in this support was a training program conducted at COMSAT Labs and Andover, Maine, in April and May of this year.

The training for the experimenters consisted of a series of lectures on the experiment in general and the GTT's in particular, followed by hands-on training on the installation, operation and maintenance of the GTT's, all conducted at the Laboratories at Clarksburg, Md. The participants from ESRO/ESTEC (Fabio Galante) and CTNE (Fernando Lopez Dominguez) received lectures on the DAQS and some hands-on training at the Labs, with the bulk of the hands-on training being conducted at the CPE installation in the old radome at the COMSAT Earth Station at Andover, Maine. The training was conducted by COMSAT Labs personnel including Jeffrey Steinhorn, Melvin Grossman, Richard Trushel, Dr. Geoffrey Hyde, Roger Bowen and William Cleary.

More recently, ISRO has sent P. Setty from the Microwave Division of the Indian Space Applications Center at Almedabad, India, for training in the use of the GTT's.

The transfer of equipment has been completed, installation of the DAQS at Buitrago is well under way, with the experiment scheduled for initiation in August 1975 in Europe, and September in India.

Dr. Hyde is Manager, Propagation Studies Department, COMSAT Labs.



A group of the Propagation Experiment trainees and their instructors at the COMSAT Labs. Pictured, left to right, are: Walter Randeu, Technical University of Graz, Austria; Claudio Marsibilio, Telespazio, Rome, Italy; Melvyn Grossman, Dr. Geoffrey Hyde, Jeffrey P. Steinhorn and Wallace P. Mercer, all of the Labs; J. E. Goodyer, Appleton Labs., Slough, U.K.; M. J. M. Van Weert, Technical University, Eindhoven, Holland; and Fabio Galante, ESTEC, Noordwijk, Holland. Not present for the photograph was Fernando Lopez Dominguez, CTNE, Madrid, Spain.

Board of Governors approves INTELSAT V RFP

IV-A (F-1) to be launched as Atlantic primary satellite

The Board of Governors at its Sixteenth Meeting approved the INTELSAT V RFP and authorized the Management Services Contractor, COMSAT, to issue the RFP as soon as possible.

The meeting was attended by 23 Governors representing 66 of the 91 signatories (With the accessions of Panama and Libyan Arab Republic, INTELSAT now has 91 members).

Among its actions the Board:

Technical and Operational Matters

- Approved the INTELSAT V RFP, which requests an initial lot of seven satellites with options exercisable from one to five years from the contract date for up to eight more satellites.

Assuming contract approval by spring or early summer of 1976, the first satellite will be available for launch by mid-1979.

- Decided that the INTELSAT IV-A (F-1) shall be launched as the primary satellite in the Atlantic Region at a nominal location of 335.5° E. Long. If the IV-A (F-1) launch and performance tests are successful, the INTELSAT IV (F-7) will continue as the major path satellite, the IV (F-3) will be relocated to 340.5° E. Long, as the spare, and the IV (F-2) will be relocated to 325° E. Long. for possible use as required. The Board also decided that the operating Indian Ocean Region satellite shall be nominally located at 63° E. Long. and the spare at 60° E. Long.

- Authorized the MSC to amend the INTELSAT IV-A contract to provide for: installation of gold leads and glassed bus strips in the INTELSAT IV-A (F-3) through (F-6) at no increase in contract price; installation of a third nutation damper in each INTELSAT IV-A at a total net price of \$159,000; and extension of the delivery dates IV-A (F-1) to August 1, (F-2) to November 1, 1975 and (F-3) to March 15, 1976.

- Authorized the MSC to take the necessary actions for adding TT&C capability to the monitoring stations in Brazil and Cameroon, at an esti-

mated cost of \$980,000; and for augmenting equipment at the four existing sites to achieve multiple satellite data processing capability at an estimated cost of \$580,000.

- Approved the allotment of one-quarter of a transponder to meet Colombia's domestic requirements, and concurrently decided that it will not consider preemptible leases for domestic services for other than quarter-, half-, or full-transponders. Colombia requested a preemptible lease for a five-year period beginning in mid-1976, under terms similar to those approved for Norway.

- Approved an agreement with Nigeria for preemptible lease of a transponder to meet its domestic requirements and authorized in principle Nigeria's request for a second transponder on a preemptible service basis in an Atlantic or Indian Ocean Region satellite.

Proposals authorized for INTELSAT V satellites

The Board of Governors of INTELSAT at its recently concluded meeting in Washington authorized the issuance of a request for proposals (RFP) covering the design, development, manufacture and test of seven INTELSAT V satellites. Options for up to eight additional satellites are also requested, such option to be exercised one to five years from date of contract.

The INTELSAT V satellites are intended to augment the INTELSAT IV-A satellites beginning in 1979. The RFP will be forwarded to an international list of qualified firms. Proposals are to be submitted on a firm fixed-price basis.

The new satellites would be launched by ATLAS/CENTAUR launch vehicles and would have a design lifetime of seven years. The principal characteristics of the INTELSAT V satellites include the use of new techniques to increase their capacity. These include four-fold use of part of the 6/4

- Approved a course of action jointly recommended by the Secretary General and Management Services Contractor, which was acceptable to Indonesia, to avoid harmful interference between the INTELSAT system and the Indonesian domestic satellite system. A memorandum of understanding will be agreed to, under which Indonesia accepts certain operating constraints but need not change the proposed locations of its satellites.

- Approved a 1975-76 program of work, on the recommendation of the BG/PC, under which the MSC will complete by the end of 1976 the first phase of studies on INTELSAT system requirements during 1986-1993. The MSC will submit biannual progress reports and priority will be given to those aspects which will have impact on the Board decisions on INTELSAT V and TDMA/DSI. Reports will also be submitted to the BG/T on long-term

GHz frequency band, through both antenna beam separation and dual polarization concepts; introduction of the 14/11 GHz band for limited coverage in high-traffic regions; and a maximum effective bandwidth of 2,280 MHz provided in a total of 27 transponders. There will be a single satellite design applicable to all three ocean regions of the INTELSAT global system.

Utilization and capacity of the new satellites will be dependent both on the earth station implementation schedules and the operational plans to be adopted. But the INTELSAT V satellites are expected to have a capacity of approximately 12,000 two-way voice circuits plus a color television channel. This compares with 4,000 circuits in the currently operational INTELSAT IV satellites and 6,000 circuits anticipated with the INTELSAT IV-A satellites.

developments which should be taken into account in establishing the 1976 research and development program.

- Approved terms for possible use by RCA Corporation-ASTRO Electronics Division (RCA-AED) of INTELSAT TT&C facilities in connection with two TELESAT launches during 1977-78. The Board established a charge of \$100,000 per launch through 1977, and \$110,000 through 1978 for such use. The terms will provide that INTELSAT requirements have priority at all times, that the contract will run until end 1980, but all terms are subject to review by INTELSAT after 1978. The MSC was authorized to conclude an agreement with RCA-AED, should it be awarded the TELESAT contract, which will incorporate the new terms and other provisions from the earlier agreement with RCA. The Board noted that the same terms will be applied to any similar request made before the end of 1975.

- Decided that the nominal bit rate for TDMA used with INTELSAT V transponders shall be 120 Mb/s, and advised that Signatories planning operational use of the prototype terminals should include an inherent capability for 120 Mb/s operation.

- Requested the MSC to conduct three studies recommended by the BG/PC: to define sensitivity of satellite capacity and system saturation to small stations, to study the operational and economic viability of small stations, and to analyze current operational plans to determine capacity available for transponder leases in each region.

- Approved the BG/T recommendations that the MSC prepare mandatory performance characteristics for 31.7 G/T stations, develop operating constraints for such stations and an operating plan for the space segment, and complete studies of the impact on the system by using stations with a lower G/T than 31.7.

- Granted a one-year extension of approval to the U.S. station at Clarksburg for access to the space segment without charge to conduct rain depolarization experiments. It also authorized the MSC to approve use of the reference earth terminal which will be used to measure polarization purity of existing earth stations, provided that the MSC ensures the terminal is used on a non-interference

Caruso resigns from INTELSAT; Latapie named as replacement



Andrea Caruso

Andrea Caruso, Director of Administration and Conference Affairs, has resigned as a senior officer from INTELSAT to return to his home in Italy. He is succeeded by Francis Jean-Pierre Latapie previously serving on the staff of the Executive Organ.

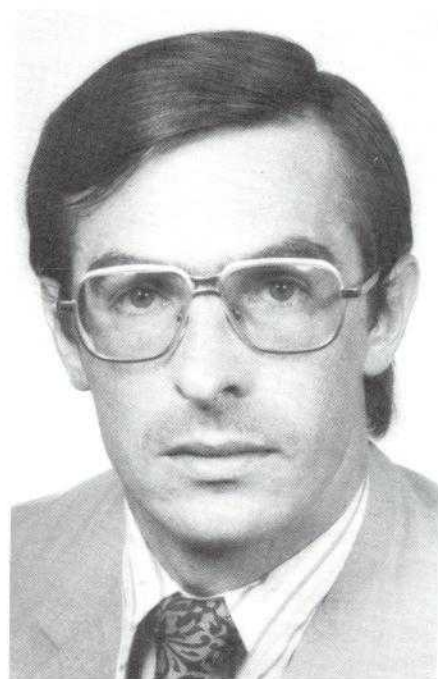
Mr. Caruso had served in his Directorship position since 1973. His association with INTELSAT dates back to 1969 and includes service in various capacities, numbering, among the earliest, Representative for Italy and Vatican City to the Interim Communications Satellite Committee (ICSC).

A veteran in INTELSAT matters, Mr. Latapie participated actively in the Definitive Arrangements negotiations leading to the establishment of the INTELSAT Organization and for the past year has served as Manager of the Technical Contracts Department in the Technical/Operations Division of the Executive Organ.

Mr. Latapie, a native of France, is married and has one child. His educa-

basis and without harmful effect on the space segment.

- Approved six Nigerian stations for operation with Nigeria's leased



Francis Jean-Pierre Latapie

tion includes graduate work at the National Engineering School for Space and Aeronautics, Paris, earning a degree in Aerospace and Aeronautical Civil Engineering; a Fulbright Fellowship to the California Institute of Technology, Pasadena, where he earned a Master of Science; and the University of Paris School of Law and Economics, earning a Master of Arts in Economics. He is accomplished in the French, English and Spanish languages.

Previous positions held include employment with the Air Force Operations Research Group, Department of Defense, Paris; Assistant Professor of Mathematics, National School of Architecture, Paris; Assistant to the Scientific Counselor, French Embassy, Washington; Member of the French Delegation to the INTELSAT Definitive Agreement negotiations; Scientific Attaché for the French Government on the West Coast of the United States; and other responsible positions.

transponder, subject to MSC approval of Nigeria's transmission plans, and verification of the stations' measured performance characteristics.

- Approved the Cagayan de Sulu (Philippines) station to operate with the standard station at Tanay via either the Pacific or Indian Region satellites, subject to a rate adjustment factor of 2.5 for telephony, normal rates for television with no additional satellite power, and verification of the performance characteristics. The Port Louis (Mauritius) station was approved to transmit telephony to a single destination with a rate adjustment factor of 2.5, and the same television and verification conditions as the Philippines terminal.

- Approved the Nauru station for service to two destinations, with a rate adjustment factor of 2.5 for telephony, and normal rates with no additional power for television service. Though the station will not be replaced by a standard terminal, it will be equipped for SCPC operation in three years.

Administrative Matters

- Decided to note the proposal received from COMSAT as Management Services Contractor (MSC) regarding changes in COMSAT personnel having key responsibilities under the contract: Mr. Martin J. Votaw will be responsible for carrying out and supervising the functions of COMSAT under the contract; Mr. Eugene T. Jilg will be responsible for the technical system implementation of the INTELSAT space segment; Mr. James B. Potts will be responsible for system operation of the INTELSAT space segment; and Mr. Lewis C. Meyer will be responsible for INTELSAT space segment procurement.

- Designated, in accordance with Article XII(d) (i) of the Operating Agreement, Mr. Reginald Westlake, Director of Finance, to serve as Acting Secretary General.

- Approved the Secretary General's appointment of Mr. Francis Latapie of France to succeed Mr. Andrea Caruso of Italy as Director of Administration and Conference Affairs.

- Approved a new salary structure and grades for the Executive Organ and authorized the Secretary General to adjust individual salaries so that they fit into the structure effective January 1, 1975.

Financial and Legal Matters

- Approved a series of recommendations by the BG/F which will result

in greater detail in budgets and stronger financial control. Specifically, capital budgets are to include an explanation of all basic assumptions used and a capital investment schedule showing the estimated total costs of each new project, annual funds required, and any revisions.

- Noted that the R&D Budget will clearly distinguish the total estimated cost of each task and the annual budget, separately listing payments to outside contractors and in-house effort.

- Decided that the MSC departmental expense budget (other than R&D) must be supported by: details on organization by department or functional areas; all costs for which each department is responsible and overhead; equivalent manpower, functional responsibilities and specific tasks of each department; any changes to staff budgets; assumptions for inflation and stipulation of underlying assumptions on launches, etc. The Executive Organ will continue to submit monthly reports on expenses.

- Approved the recommendations of the BG/F to maintain the present system of occasional use charges for other than TV or cable restoration,

and to reduce the basic tariff from which the daily rates are derived from \$750 to \$705 per month, effective 1 April 1975.

- Requested the MSC in consultation with the Secretary General to study further the legal and commercial implications of transferring chip technology to potential manufacturers of SCPC and SPADE equipment.

- Approved the recommendation of the BG/F that, commencing with INTELSAT IV (F-6), launch failures will be depreciated from the first day of the month following launch, for a period corresponding to that used for other satellites in the series.

- Decided that the INTELSAT IV-A will be depreciated under the same policies as were used for the IV, with the new procedure for launch failures. Depreciation policy will be reviewed annually.

The Seventeenth Meeting of the Board of Governors will begin September 24th in Washington.

The preceding report was prepared by Eleanor Alberstadt of the U.S. INTELSAT Division.

INTELSAT lends satellites to Smithsonian

An agreement for the loan of three INTELSAT communications satellites to the Smithsonian Institution, as part of the National Air and Space Museum's 1976 inaugural display, was signed recently by Santiago Astrain, Secretary General of INTELSAT, and Michael Collins, Director of the Smithsonian's National Air and Space Museum.

The satellite display is to consist of an "Early Bird" INTELSAT I and the second and third generation satellites, INTELSAT II and III. The communications capabilities of these satellites range from 240 to 1,200 telephone circuits or, alternatively, from one to four television channels. Because of their great size, the INTELSAT IV and

IV-A satellites will not be displayed at the Museum.

More than a million Americans are expected to see the INTELSAT display at the mammoth new National Air and Space Museum scheduled for opening on July 4, 1976.

Present at the ceremony held at INTELSAT Headquarters at L'Enfant Plaza were Frederick C. Durant, III, Assistant Director for Astronautics of the Smithsonian's National Air and Space Museum, and Richard R. Colino, Assistant Vice President, U.S. INTELSAT Division, who is the U.S. Governor on the INTELSAT Board of Governors and currently Vice Chairman of the Board.

COMSAT exhibit at NAACP Convention



Assisting at the COMSAT display at the NAACP Convention were, left to right, Angelina Contreras, Glenda Cooper, Vicki Moore and Marva Stevens.



COMSAT's Angelina Contreras greets a young visitor at the NAACP exhibit. Mynique Wills of Imperial Valley, California, seemed pleased and impressed with the exhibit.

COMSAT was among approximately 300 exhibitors participating in the Commerce and Industry Show at the Annual Convention of the National Association for the Advancement of Colored People held in Washington early in July.

Participants in the show included corporations, government agencies and private non-profit organizations from across the nation. Among these were the Civil Service Commission, Eastman Kodak, Exxon, Ford Motor Company, General Electric, General Motors, IBM, Lockheed, U.S. Steel, NASA, the Manpower Administration and others.

COMSAT's exhibit occupied a ten-by-ten-foot booth containing a satellite model and handout literature concerning the Corporation and its diverse operations.

The Convention was the NAACP's sixty-sixth annual meeting and the sixth presentation of the Commerce and Industry Show. Although COMSAT participated in the NAACP Convention for the first time it has been involved in similar programs sponsored by the National Urban League for the past several years, according to William B. Lockett, Assistant Director of Personnel for Equal Employment Opportunity and Human Resources Development.

Lockett noted that COMSAT's participation in the convention was in accordance with the Affirmative Ac-

tion Program of the Office of Federal Contract Compliance, and provided extra benefits by developing employ-

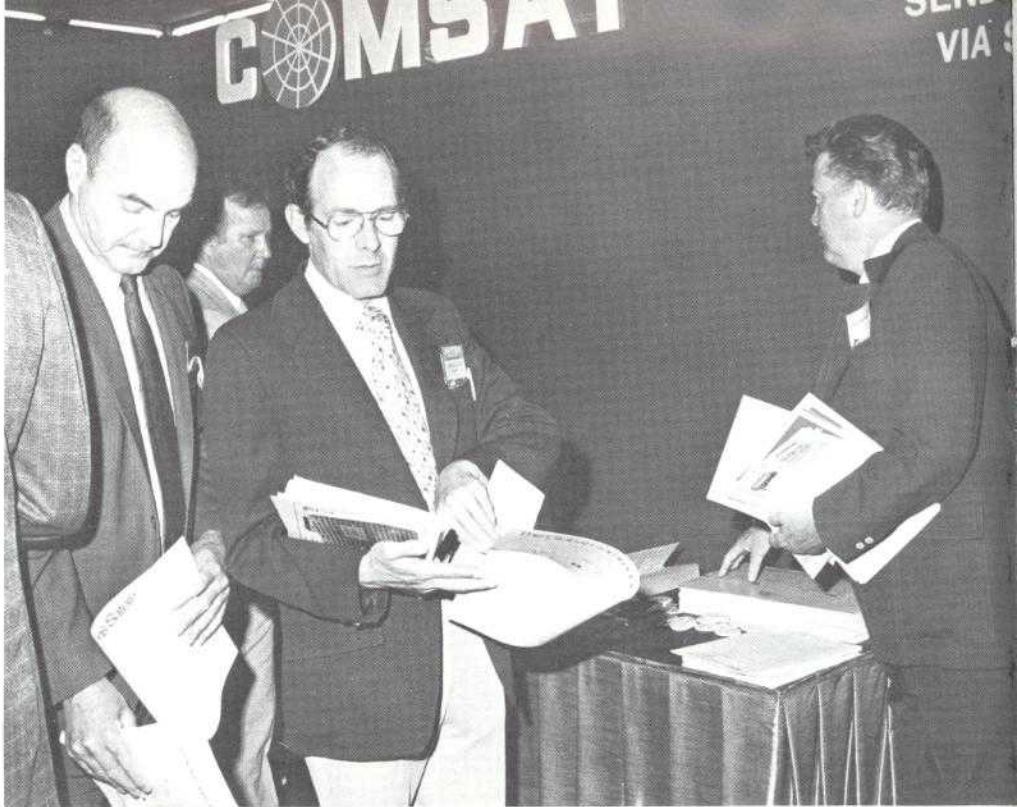
ment interest among minorities and in acquainting the public with COMSAT and its global communications service.



Valeria Russ, a summer intern in the COMSAT Public Information Office, interviews William Lockett representing COMSAT at the NAACP Conference and Exhibition held recently at the Sheraton-Park Hotel in Washington. Laying out literature for visitors to the exhibit are Glenda Cooper (second from right) and Vicki Moore.



COMSAT hostess Sherry Wells attaches a pin reading, "DIGISAT via COMSAT," to the lapel of Tom Malia, Editor of *Telecommunications Report*, who was visiting the AFCEA exhibit.



Visitors to the DIGISAT display help themselves to literature describing COMSAT and the global satellite system.

DIGISAT demonstrated for Armed Forces Association

COMSAT demonstrated its new service offering, DIGISAT, at the Armed Forces Communications and Electronics Association (AFCEA) 29th Annual Convention and Exhibition held recently at the Sheraton Park Hotel in Washington.

Within a 30-foot booth, the COMSAT exhibit had a DACOM, Inc. digital facsimile transceiver operating over a DIGISAT circuit with another transceiver to illustrate one typical application of this new service offering. A transceiver on one side of the booth was connected through a modem and terrestrial circuitry to a similar modem and the DIGISAT equipment at the Etam earth station. The circuit was then looped through an INTELSAT IV Atlantic satellite and extended from the Etam DIGISAT equipment through modems and terrestrial circuitry to a transceiver on the other side of the booth. Page copy was then exchanged between the two transreceivers at 9,600 bits per second.

COMSAT's new service offering provides international digital satellite circuits especially for data users operating at rates of 2,400, 4,800 or 9,600

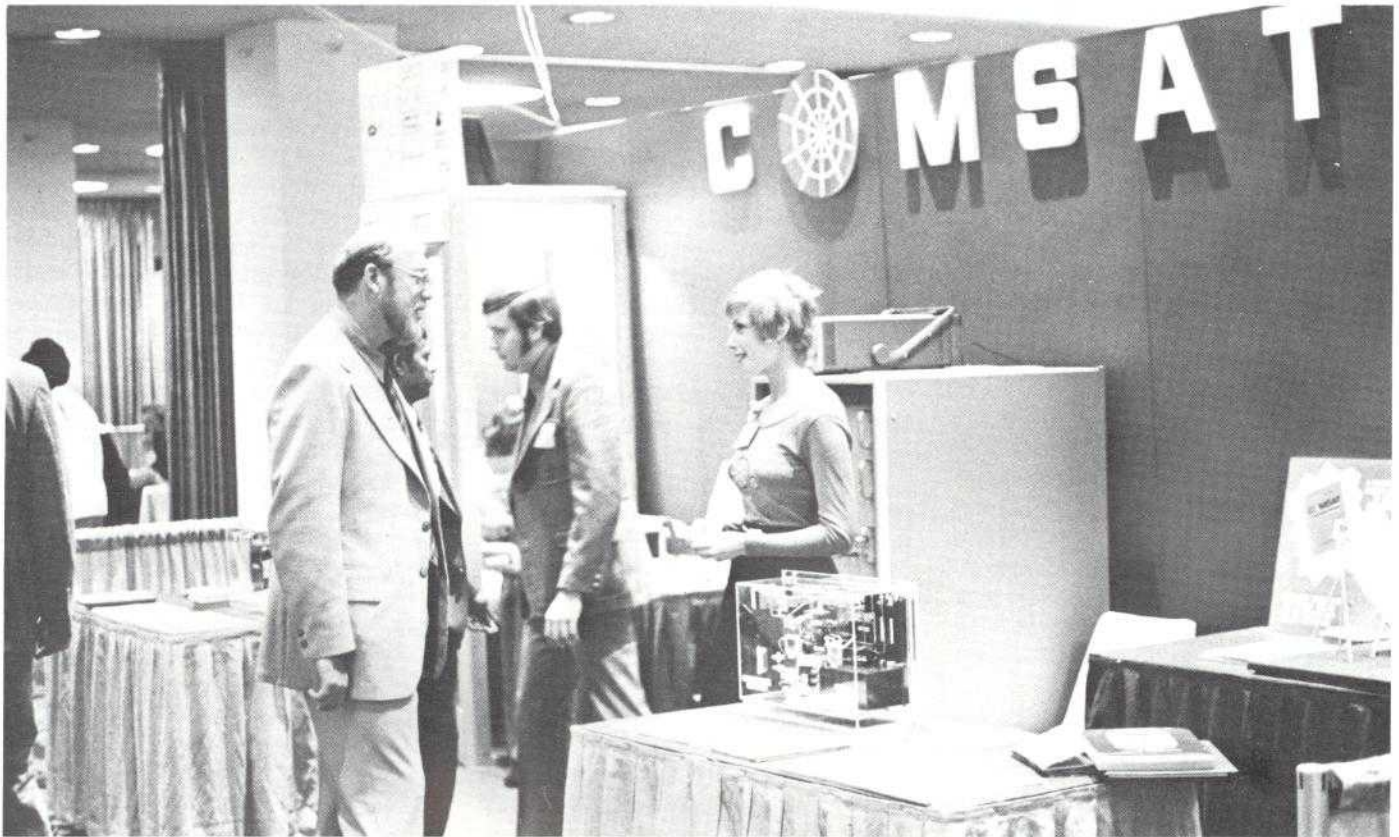
bps. This advanced digital service will interface with terrestrial analog or digital channels. DIGISAT represents a significant economic breakthrough by using the more efficient digital transmission capabilities unique to satellite systems.

The COMSAT demonstration excited interest from hundreds of visitors from industry and the military services attracted by the demonstration. Serving as hostesses for COMSAT were Sherry Wells, Pat Irby, Pam Dahlgren and Linda Kortbawi.



COMSAT exhibit at the AFCEA Convention in Washington showing the two transceivers and modems. The inverted "V" with the INTELSAT IV model was used to illustrate the DIGISAT circuit.

Echo Suppressor and Echo Canceller compared at San Francisco ICC exhibit



Neil R. Helm, Assistant Manager for Development Applications, COMSAT Labs, discusses exhibit with COMSAT's Donna Schanes at the ICC Convention in San Francisco. Partially obscured by Mr. Helm is Krishna Virupaksha with Dan S. Fischer, both from the Labs. The telephone booth at the rear was one of the booths used by visitors to talk over a double-hop satellite circuit.

COMSAT Labs provided an opportunity for attendees to the 11th Annual International Conference on Communications (ICC) to talk over a double-hop satellite circuit while demonstrating a standard type of echo suppressor with digitally controlled features and a new echo canceller recently tested in the INTELSAT system.

The Conference and Exhibition was held in mid-June at the Fairmont Hotel in San Francisco.

The COMSAT exhibit demonstrated Echo Control technology by using two telephone booths within the 20-foot space and encouraging conference par-

ticipants to call from one booth (east) to the other (west). The circuits were then routed over terrestrial lines to the Jamesburg earth station, then up through the Pacific INTELSAT IV satellite to the Pamalu, Hawaii, earth station, back through the satellite to Jamesburg and onward to the hotel, creating a live double-hop conversation.

A digital echo suppressor was located on the west side telephone, pro-

tecting the east side telephone talker against echo by the echo canceller and the west talker by the digital echo suppressor. The echo canceller, designed and built at the Laboratories, is the result of more than five years of research and development.

Technical representatives from industry showed great interest at the COMSAT demonstration comparing speech and double talk patterns with both the suppressor and the canceller.

General Sampson retires

Closes book on four decades of communications

By JAMES L. MCKENNA

When an old communicator, once a general, once a corporate executive, retires, he leaves his leadership accomplishments behind as a beacon for those who take his place.

"An old communicator," it's a proud phrase to men like George P. Sampson, Major General, U.S. Army; Senior Vice President, International Systems Division, COMSAT.

He departed from COMSAT on July 28 to make preparations for moving with his wife, Vera, to their retirement home in Titusville, Florida. Before going, he walked from his eighth floor office through the COMSAT building, bidding everyone a fond farewell.

General Sampson leaves a 40-year mark of distinguished leadership in world communications, both military and commercial. Among his major achievements are the important roles he played in establishment of:

- the first hotline between the Soviet Union and the United States;
- the global communications satellite system; and
- the satellite links which brought the People's Republic of China back in touch with other countries.

Of things yet to come, he predicts that:

- COMSAT's big future lies in the new satellite systems being developed by COMSAT GENERAL;
- all communications will be transmitted digitally before long; and
- competition will play an increasingly important role in the communications industry in the years ahead.

General Sampson achieved an international reputation as a communicator. He never lost his zeal or optimism. "It's only through communications that we get a better understanding and that's what it's all about."

"I went through three wars and they didn't accomplish anything," he says. "But, through communication,

followed by actions that match words, we begin to understand each other."

To illustrate his point, General Sampson cites the establishment of the original US/USSR hotline, which was one of his most satisfying accomplishments. While serving as Deputy Director of the Defense Communications Agency (DCA) in 1963, he was designated the U.S. technical representative for hotline negotiations in Geneva, a part of the Worldwide Disarmament Conference.

"Remember," the General said, "relations between the United States and the Soviet Union were extremely strained at the time. The Cuban missile crisis was still fresh in everyone's mind."

Arriving in Switzerland, the U.S. hotline team, "... perhaps somewhat naively but certainly optimistically," hoped to conclude its work within a fortnight.

"For the first two or three weeks we made little progress," he recalled, "but by being face-to-face, we gradually began to communicate and this led to progress in working out the hotline arrangements. We had 19 formal meetings, interlaced with several informal get-togethers, and many telephone exchanges on various matters."

Forty nine days after talks began to set up the teleprinter circuit between the Kremlin and the White House (rather than a direct telephone link as many people still believe), the agreement was signed by the USSR and US representatives.

Seeing the INTELSAT system literally develop from a "mere dream into a worldwide reality" also gives him a lot of satisfaction, General Sampson said.

"We had to seek and recruit people at the same time that we developed a system," he recalled. "We had to get countries interested in participating in the system on a joint venture basis. We took a gamble on the synchronous satellite when others questioned it. Fortunately, we were successful and our success has paid big

Mr. McKenna is a COMSAT Information Officer.



dividends to more than a hundred other nations of the world.”

His role in helping to set up the satellite link between the United States and the People’s Republic of China prior to President Nixon’s visit in February 1972 is another milestone in the General’s record book. He was a member of the U.S. advance group that made the arrangements.

He helped arrange for the earth stations that the PRC would use to work with the INTELSAT satellites, visiting Peking, Hangchow and Shanghai, the same three cities President Nixon visited.

While the communications links were set up initially for the Nixon visit, they later became permanent. General Sampson and his wife returned to the PRC later in 1972 to consult on permanent outside satellite links. Today the PRC maintains full-time communication with several countries through the INTELSAT satellites.

General Sampson believes that COMSAT’s international services will continue to grow steadily, but the Missouri native uses one of his father’s folksy statements, “You can’t put all of your eggs in one basket,” to describe his business thoughts on COMSAT’s future.

He believes that COMSAT must “work even harder” to build higher capacity satellites and to further improve the versatility, flexibility and reliability of satellite communications services. And he expresses great optimism for the new programs in which COMSAT GENERAL is engaged to provide maritime, U.S. domestic and

aeronautical satellite communications services.

He says his military career, in which he rose in 24 years from a second lieutenant’s gold bars to a general’s star, was “a lot of luck, hard work and being in the right place at the right time.”

On selecting a military career by choice in 1935, the General recalled, “You must remember, those were depression years. Then you have 10 or 11 years of your life invested, including service in a war. There’s no turning back.” He entered telecommunications work in the Army’s Signal Corps in 1941 as a wire officer.

Joining COMSAT in February 1965 as Director of Operations, General Sampson later in the same year was elected by the Board of Directors as Vice President-Operations.

In February, 1973, he was elected Senior Vice President, International System Division, with added responsibilities of liaison and coordination of COMSAT’s activities with its partners in INTELSAT.

In commenting on General Sampson’s retirement, COMSAT President Joseph V. Charyk said: “General Sampson has left an indelible mark on world communications. His contributions to the remarkable growth of COMSAT and the global communications revolution of the past decade have been significant. COMSAT and communicators throughout the world will miss his daily presence.”

When he decided to retire, COMSAT’s Board split General Sampson’s duties and created two new divisions which resulted in numerous upward move-



Retiring General and Mrs. Sampson pause for a photograph in front of a six-foot high reproduction of a photo taken earlier during the farewell buffet held in their honor at the Army and Navy Club in Virginia.

ments in the Corporation’s executive ranks.

He believes that “all the moves are a good idea. Look at the number of people who have been promoted. That means new blood, new enthusiasm, new opportunity for advancement from within the Corporation.”

In retiring to near Cape Canaveral, General Sampson says he chose that area for several reasons, including the nearness of golf courses and the sunshine his wife enjoys so much. He plays down the urge to remain near the launching of bigger and better satellites that are helping to bring nations of the world closer together.

He’s worried though, about the nation’s energy reserves. So much, in fact, that his retirement location was planned to be near shopping, church and medical facilities.

“This energy crisis is serious,” he thinks. “A guy like me might get a gallon of gas every two months. I can ride a bicycle.”

After a 40-year career that shines like a beacon, who would believe it’s back to basics, like biking rather than driving? Yet, that perhaps best reflects General Sampson, straight to the point, separating the wheat from the chaff.

A “Hotline Note” from a President:

THE WHITE HOUSE WASHINGTON

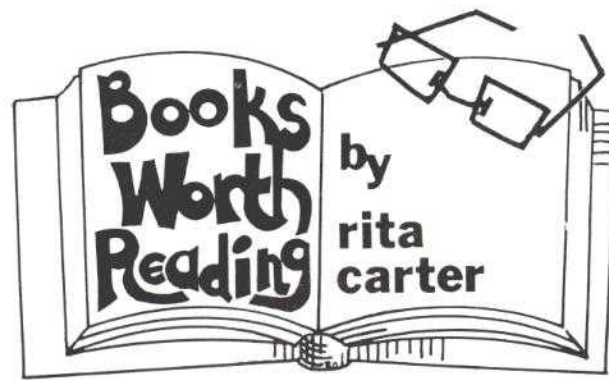
July 30, 1963

Dear General Sampson:

I want you to know how gratified I am at the conclusion on June 20, 1963, of the Communications Link Agreement with the USSR. Such a practical step toward reducing the chances of accidental war is bound to serve our national interests, as well as those of all mankind.

I congratulate you on the important part you played in the negotiation of this Agreement. Your outstanding technical ability and your patient skill in negotiation enabled you to make a major contribution to this important achievement.

Sincerely,
(s) JOHN F. KENNEDY



Modern Microelectronics by Dr. MAX FOGIEL.

Modern Microelectronics updates past publications of the Research and Education Association. It also includes entirely new sections, drawing from the research work and experience of Bell Telephone Labs, Boeing, Fairchild Semiconductor, Hughes Aircraft, IBM, Lockheed, and RCA as well

as many others. The book is organized to provide detailed know-how of every aspect of the field of microelectronics, even to readers with no previous knowledge of the field. The material is presented in descriptive as well as analytical form, and is organized from the viewpoints of principles, design techniques, fabrication processes, and profit potentials. Capabilities of the

microelectronics techniques in use and under consideration are discussed.

Included in the contents are reviews on the latest available in large scale integration, microwave integrated circuits, bipolar versus mos design, complementary circuits, optoelectronics, ion implementation, circuit testing, reliability, redundancy design, and procurement. The material is presented clearly, enabling a practitioner in one phase of microelectronics to gain the working knowledge of other phases. The different microelectronic techniques under current development are described to enable the reader to follow the technical literature and thereby keep abreast of the art as it develops.

The first section of the book, "Microelectronics at a Glance," contains a detailed summary and outline dealing with microelectronics on the management level. There are five parts included in the contents of the remaining text: Part I describes thin and thick film circuits; Part II, integrated circuitry/semiconductor devices; Part III, circuit design; Part IV, interconnections, packaging, and circuit testing; and Part V, reliability, maintainability, and procurement. An extensive list of references is included for each of the five parts of the book. In addition, all topics are covered thoroughly with physical descriptions accompanied by numerical data. Finally, *Modern Microelectronics* includes a glossary of terms and a problems and review section for each chapter.

New Books

Reference

Library and Reference Facilities in the Area of the District of Columbia. 9th ed. 1975.

World Aviation Directory. (including World Space Directory). Spring 1975 ed.

Books

Advances in Modern Engineering Series. Vol. I-IV.

SMYTH, MICHAEL P. *Mathematics: The Formal Tools of Engineering.* Vol. I.

VARTANIAN, MICHAEL M. *The Computational Tools of Engineering.* Vol. II.

SMITH, DAVID B. & ROWLAND G. *Systems Engineering and Management.* Vol. III.

HABER, FRED. *An Introduction to Information and Communication Theory.* Vol. IV.

ALJIAN, GEORGE W. *Purchasing Handbook.* 1973

FOGIEL, MAX. *Modern Microelectronics.*

FREEMAN, ROGER L. *Telecommunication Transmission Handbook.*

GREEN, PAUL E., JR. & LUCKY, ROBERT W. *Computer Communications.* IEEE Press Selected Reprint Series.

MAO, J. C. *Quantitative Analysis of Financial Decisions.*

PETERSON, W. WESLEY & WELDON E. J., JR. *Error Correcting Codes.*

SAWYER, LAWRENCE B. *The Practice of Modern Internal Auditing.*

Personnel Question Box

Among the questions most frequently asked of Personnel are those dealing with claims and the deductible aspects of Group Medical and Group Dental Insurance. For example, there is confusion as to when claim forms are required to be submitted and uncertainties as to how and when deductibles are satisfied. In this issue an attempt will be made to clarify questions in both areas and provide examples of each.

Let's take Group Medical Insurance first and respond to the question, "When should a claim form be submitted?" A claim form must be submitted for:

(1) the first claim of the calendar year, so that accumulations to satisfy the deductible may be established, (2) each separate accident, and (3) each major disability.

For example, if Bill made his first claim of the year in April, he should complete Section I and Part A of a claim form, have the physician providing the most services complete Part B of the form and submit this form along with all medical bills and prescriptions to the insurance company. Unless Bill suffers an accident or has a major disability, no additional claim forms are required during the calendar year. Subsequent doctor or hospital statements may be submitted without a claim form if they clearly specify "COMSAT" and the Group Insurance number G-19502, refer to the nature of the illness, clearly identify the name of the doctor or hospital and services rendered, and are submitted within the calendar year.

The second area of uncertainty deals with the deductible. The group medical deductible is that portion of unreimbursable medical expenses you pay each year before major medical benefits become effective. This is computed at one percent of your base salary or \$100.00, whichever is less. If you have a family plan, a separate de-

ductible applies to you and each covered dependent. In order to prevent a financial hardship, a limitation of two deductibles per family has been established.

Once two deductibles have been satisfied, covered expenses for other family members, whether incurred prior to or after satisfaction of the family deductible, will automatically be reimbursed as Major Medical Expenses. If one family member satisfies the deductible, that member will, of course, be eligible to receive major medical benefits without the need of a second person satisfying the deductible.

Another item of interest regarding the deductible is that any expenses incurred during the last three months of the year, applied toward a deductible, may also be applied toward the deductible for the following year.

Again, let's give an example. The Lincoln family had very few medical expenses during the first nine months of the year. Mr. Lincoln had paid \$30.00 towards his deductible, Mrs. Lincoln had paid \$20.00 towards hers, and daughter Gail had paid \$70.00 towards hers. In October, Mr. Lincoln was confined to the hospital where the remaining \$70.00 of his deductible was satisfied. In December, Mrs. Lincoln had an operation and the remainder of her deductible was also satisfied. Now the Lincolns may benefit from (1) being reimbursed for 80% of the \$70.00 of Gail Lincoln's medical expenses, and (2) having credit towards the deductible for the next year of \$70.00 for Mr. Lincoln and \$80.00 for Mrs. Lincoln, since these amounts were applied towards their deductibles during the last three months of the year.

Now, to clear up some of the confusion in the same areas of the Group Dental Insurance. First, in making a claim, the procedure outlined earlier in reference to the Group Medical In-

surance Claim Form is applicable to the Group Dental Claim Form. The group dental deductible is \$25.00 per individual, which you are required to pay before you are entitled to reimbursement. If you have dependent coverage, the maximum family deductible is \$50.00. However, one member must satisfy the \$25.00 portion of the deductible.

For example, in the Smith family there are three children. Mr. and Mrs. Smith decided that the entire family should have a dental checkup. The bill for these services was \$20.00 for each person or a total of \$100.00. There is no reimbursement for these services since no family member has satisfied the \$25.00 deductible. However, six months later Mr. Smith returns to the dentist and receives a bill for \$10.00. His deductible is now satisfied, and the dental expenses for any of the remaining family members may be combined to satisfy the family deductible. The insurance company will automatically reimburse the Smith family for dental expenses in excess of the \$50 deductible as follows:

	Paid	Credited toward deductible	Ex-cess	Re-fund
Smith	\$30	\$25	\$5	\$4
Mrs. S.	20	20	0	0
Child 1	20	5	15	12
Child 2	20	0	20	16
Child 3	20	0	20	16

Total reimbursed—\$48

NOTE: The dental expenses for Mrs. Smith and Child 1 are combined to satisfy the second \$25.00. In addition, the Smiths will be eligible for reimbursement for any other dental expenses incurred during the current year at the applicable percentage rate.

Questions pertaining to this article, or insurance in general, should be addressed to Personnel's Mel Williams, room 7095, tel. ext. 6388, at the Plaza.

People and Events

Carroll to direct U.S. earth station operations

William B. Carroll, earth station manager at Etam, West Virginia since 1967, has been appointed Director, U.S. Systems Management. He will be replaced by William L. Miller, presently Manager of COMSAT's Earth Segment Program Office.

Mr. Carroll will be responsible for operational matters relating to all communications satellite earth stations operated by COMSAT in the United States.

Mr. Miller, an employee of COMSAT for nearly 10 years, has served in various management positions related to the operation of earth stations in the global system, including management of the station at Paumalu, Hawaii, and special assistant responsibility for COMSAT's interests in Alaska.

The assignments were effective August 11. Mr. Carroll and his family will move to the Washington, D.C. area and Mr. Miller and his family will move to Kingwood, West Virginia.

Widow of former Chairman presented message from COMSAT Board.



Mrs. James McCormack, widow of the former COMSAT Chairman and Chief Executive Officer, is presented with a framed copy of the resolution adopted by the COMSAT Board of Directors as Lucius D. Battle, Senior Vice President for Corporate Affairs, looks on. The resolution read: WHEREAS this Board is saddened by the death on Jan. 3, 1975 of General James McCormack . . . ; and WHEREAS General McCormack displayed a keen devotion to his responsibilities and to the stewardship of the Corporation during a critical and formative period of its development and always comported himself with a dignity and gentleness that reflected outstanding human qualities; RESOLVED that the Directors of Communications Satellite Corporation hereby record their deep sense of personal loss and their recognition of the great personal contribution that General McCormack made to the Corporation and to the global communications satellite system . . .

Ulans appointed Director, European Office; Nilson assigned COMSAT General.

Roman I. Ulans, previously Director of COMSAT's Asia Office in Singapore, has been appointed Director of the European Office in Geneva, replacing Dr. Mats C. Nilson, who will be returning to Washington for an assignment with COMSAT GENERAL.

Joining COMSAT in 1966 as Manager for Middle East Development in the International Development Division, Mr. Ulans opened COMSAT's Asia Office in Singapore in 1973 and since that time has served as its Director. A retired Army Colonel, he

holds a BS Degree in Electrical Engineering from M.I.T. and a Master's Degree in Business Administration from the Harvard Business School.

Merians replaces Ulans in Singapore

Miles Merians, Assistant Director of the Asia Office in Singapore, has been appointed Director, replacing Roman I. Ulans recently designated Director of the European Office in

Geneva.

Mr. Merians, who holds a BS Degree in Electrical Engineering from Pennsylvania State University, has been Assistant Director of the Asia Office since it opened in January, 1973. Prior to this he held the position of Liaison Officer in the COMSAT European Office from May, 1969, until the opening of the Asia Office. From 1967 until 1969 he was Manager for Latin American Development in the International Development Division.

Amateur radio operators demonstrate proficiency during annual Field Day

By CAL COTNER

The COMSAT Labs at Clarksburg provided the grounds for the 1975 Amateur Radio Field Day conducted recently with the COMSAT and IBM Amateur Radio Clubs along with amateurs from CML and elsewhere joining in the competition.

The annual contest conducted among radio clubs throughout the United States and Canada has as its objective the demonstration of the proficiency of operators in contacting as many other operators as possible within a 24-hour period under simulated emergency conditions.

This year the number of stations in simultaneous operation was reduced from four to two and, except for a very high frequency operation, wire antennas were used throughout. One station used a VEE Beam, 300 feet long on each leg on the high frequency bands. The other station used a folded dipole for the 3.8-MHz band and a Bisquare antenna, or diamond shaped loop of wire, 33 feet on each side on the other high frequency bands. Bob Short (W3TOB) of IBM and Cal Cotner (K4JSI) and Dave Reiser of COMSAT built the antennas for Field Day. Bob brought his Collins S-Line equipment and the COMSAT ARC Drake equipment was used in the second station. VHF contacts were made on equipment made available by Gene Marden (WA3RZH) of IBM.

At noon Saturday everyone gathered for lunch prior to setting up the stations. Slingshots and spin-fishing equipment were used to pull up heavier cords which supported the wire antennas high in the trees. The station equipment was set up on plywood and sawhorse supports under canvas shelter supplied by Kim Kaiser of COMSAT and Frank Hadley of IBM. Promptly at 3:30 p.m. the gasoline generators were turned on and operation began under the call sign K3AK/3.

Mr. Cotner is a member of the technical staff at COMSAT Laboratories.

Bonus points were available for making at least one contact without use of batteries or engine-driven generators. John Hannsen (W3DZM) of COMSAT connected two bicycle generators in series to provide sufficient power for a small VHF transceiver. He then pedaled his way through several contacts with the bicycle on rollers. Success was a powerful stimulant, however, and eventually the voltage soared from 12 to 18 volts, causing some transistors in the transceiver to "surrender."

During the 24-hour contest period, contacts were made with 922 other groups and individual amateurs throughout the world: 610 of the contacts were made using single sideband (SSB) or FM voice and 312 using international Morse (CW). This should be sufficient to place in the top 25 per-

cent nationwide in the two-transmitter category.

Denny Avers (W3DRY) of IBM and Chuck Dorian (W3JPT) of COMSAT set a fast pace on SSB at the beginning while Ed Bondurant (W4WXL) of CML and Bob Short (W3TOB) of IBM finished the CW operation with a very high contact rate.

Special thanks are due Dave Weinreich (WA2VUJ) of COMSAT who provided food and drink for the Field Day period. This included charcoal grilled steaks for Saturday supper and a chicken dinner on Sunday. Eggs to order made up Sunday breakfast and a pizza snack and bottomless coffee pot kept the operators going through the night. To Dave Reiser of COMSAT goes credit for providing our emergency power for the contest period without a single interruption.

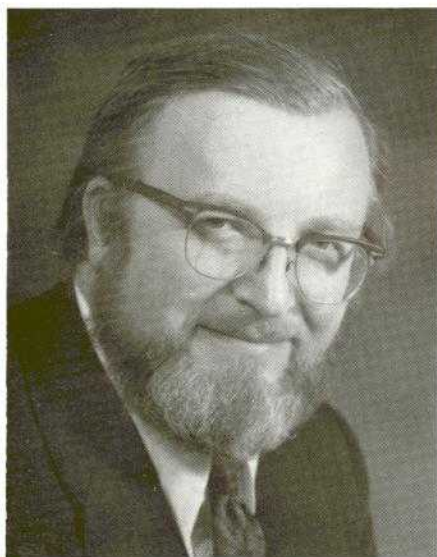
Savings Bonds winners



Director of Personnel David S. Nye, left, presents \$25 Savings Bonds to Dr. Robert C. Barthle, Assistant Vice President, Ground Systems, for winners Paul Mauzy of Etam and Thomas Ota of Paumalu. Also receiving a bond was Patricia Dellar of Accounting. The names of the three winners were drawn from among those recently enrolling in the Annual Savings Bond Drive through the Payroll Deduction Plan. According to Personnel's Mel Williams, the number of participants in the program more than doubled as the result of the drive.

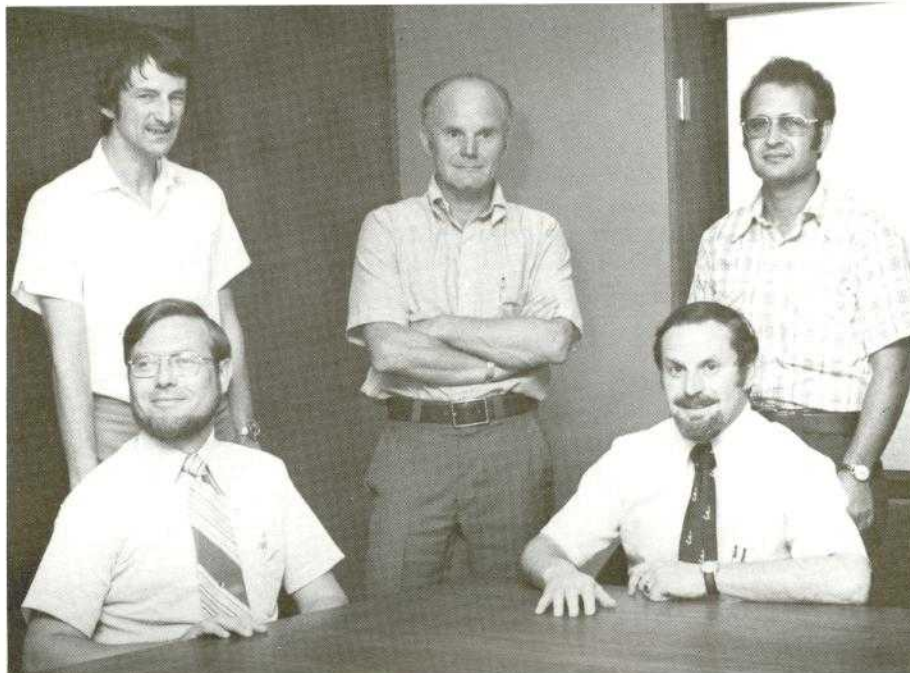
Hyde serves as delegate to scientific assembly in Peru

Dr. Geoffrey Hyde, Manager of the Propagation Studies Department of the Transmission Systems Laboratory, was nominated a member of the National Academy of Sciences Research Council Delegation to the URSI General Assembly in Lima, Peru, held in August. He served as a member of the U.S. Delegation for URSI (Scientific International Radio Union) Commission II, whose activities concern non-ionospheric propagation.



Doctor Hyde was born, raised and educated in Toronto, Canada. He received the B.A.Sc. degree in Engineering Physics in 1953, and the M.A.Sc. degree in Electrical Engineering in 1959, both from the University of Toronto. In 1967 he received the Ph.D. in Electrical Engineering from the University of Pennsylvania.

Patent Incentive awards presented



Dr. B. I. Edelson, Director, COMSAT Laboratories, seated at right, presented Patent Incentive awards to J. F. Allison, seated, and, left to right, Cristoph E. Mahle, Akos G. Revesz and Francois T. Assal. Also receiving Incentive awards but not appearing in

above photo were Arnold L. Berman, Robert J. Dendall, Otakar A. Horna, Andrew Meulenberg, Jr., and Chester J. Pentlicki, and former COMSAT employees N.K.M. Chitre, Bertram Magenheim and Benjamin Pontano.

Free guitar lessons



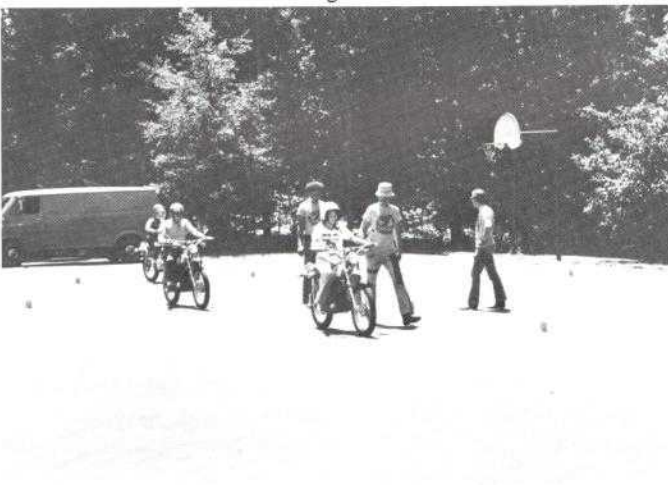
Don Flora instructs a group of beginners in the rudiments of guitar playing. The classes are held each Wednesday at noon at the Plaza. Approximately 25 students make up the first class with a second class tentatively scheduled in the Fall. An intermediate class is being considered for the Spring. Flora, who has given music instructions previously, is assisted by Pat Irby and Tom Calvit.

"Learn to ride" program

The CEA Motorcycle Club at COMSAT Labs recently concluded a "Learn to Ride" program during which 38 potential "bike riders," many who had not ridden motorcycles be-



Following the orientation lecture, instructors showed the beginners those features necessary to the operation of the bike. Throughout the indoctrination, emphasis was placed by instructors on proper operation and control, safety features and the hazards of riding.



Instructors followed their students around the course to insure their mastery of the bikes. Within a brief time the students were "soloing" and thoroughly enjoying their newly learned skill.



fore, received indoctrination on the fundamentals of motorcycle handling and riding. Nine small bikes were loaned to the Club by Yamaha of Fredrick, Md., for the orientation.



Licensed, experienced instructors provided basic instruction in gear shifting, throttle and clutch control, stopping and maneuvering. Here the beginners line up to begin riding around the course to get the feel of the motorcycle.



CEA Motorcycle Club instructors and assistants contribute their time off to promoting motorcycle skill and safety.

Labs Closeup

Brent Jacocks, Technical Publications

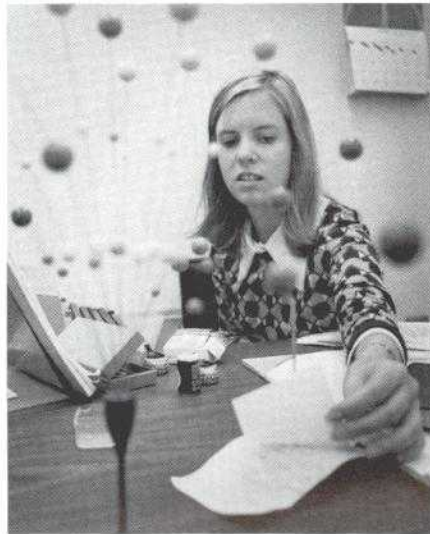
BY SHIRLEY TAYLOR

If you looked at a copy of the Spring 1975 issue of *COMSAT Technical Review*, you may have noticed a new name on the editorial masthead under Technical Editors—Margaret B. Jacocks. This able young lady, the former Margaret Brent O'Hara, has been at the Labs for six years and is a vital member of the Technical Publications Department, managed by Leonard F. Smith.

Named for her ancestor, Margaret Brent, an early Maryland politician, lawyer and landowner, Brent is married to Ritchie Jacocks, a computer operator, named for his relative, former Governor Ritchie of Maryland. High school sweethearts at Richard Montgomery in Rockville, the two went their separate ways in college but were married in 1972. They are waiting now to move into their first purchased home, a townhouse in Gaithersburg.

Brent earned her B.A. in English from Dickinson College, Carlisle, Pa. in 1968. Although trained in education, she found she didn't care for teaching, and spent the year following graduation working as a real estate title searcher. She felt there was little future in such work and came to COMSAT Labs as a Technical Information Assistant in 1969. In the beginning she helped in the organization of the Technical Publications Department, new at the Labs when it moved into the building at Clarksburg. At that time she assisted in the development of procedures and goals for the new department, and worked into her present responsibility of editing all material written for publication at the Labs.

She edits operation manuals, proposals (for contracts), technical papers and reports, finding her school courses in physics, chemistry and calculus useful in this work. Occasionally she is called upon to edit technical memoranda and compose brochures, personnel advertisements, and articles



Brent Jacocks
Technical Editor

for COMSAT NEWS. She edits all papers appearing in *COMSAT Technical Review* and has done so since its inception in 1971. She developed the format for proposals and other written material, and in her "spare time" works on a lab manual and updating the Secretary's Handbook. She supervises and assists in the work of technical typists in the department and coordinates their work with the authors.

Brent says that any job has its ups and downs, and remembers spending hours arguing over placement of punctuation and explaining the need for grammatical agreement and uniformity in writing style to reluctant authors who could not see the need for such fine points. If there are wishes she would have about her work, they would be more time for the department to complete assignments, more typing help, and particularly backups for the technical typist and herself. As the matter now stands, if she is ill or on vacation, there is nobody there to do her work, and it waits for her return. While it is very nice to feel "needed," being indispensable has great disadvantages in terms of a private life!

On the plus side, Brent says that

her happier moments come with the opportunity to work with so many different people, particularly with the foreign members of the staff who have some trouble expressing themselves in English, and whom she feels she is able to help. A treasured possession is a letter from an Official of Nippon Electric Co. in Japan, commending and thanking her for assistance in re-writing a contract report prepared by them. She had spent many long hours deciphering the Japanese phraseology, and had written copious notes explaining her work, hoping it would help the writers understand English a little better. When the letter of appreciation arrived, however, she was somewhat amused to see that it was couched in more awkward English than the original contract report, but the meaning was clear that they were most happy with her "kindly" efforts.

Brent and her husband enjoy attending sports events, swimming, tennis, and camping out. They both like photography and have their own dark room. Brent is interested in refinishing furniture, and recently took a course in upholstering. For relaxation she likes to read philosophy, science fiction, and mysteries; sew; and occasionally do some creative writing. She would like to obtain a Master's Degree in Journalism and perhaps have her own editorial consulting firm someday.

Mrs. Taylor is in the Senior Scientist's Office at the Labs.

Network Bits

ETAM. Etam's Facilities Department has undergone a few changes recently. **Bill Adams** and **Jerry Hart**, Senior Facilities Mechanics, have both resigned. Bill to go into farming at his home in Tannelton, West Virginia, and Jerry has joined the Panama Canal Company.

Marvin Miller has joined the Etam Station as a Facilities Mechanic. Marvin resides in Parsons, West Virginia, with his wife, **Lana**, and small son.

Phyllis Loughrie has joined the Etam Station for the summer months during the absence of **Cliff Sigley**, Advance Industrial Security janitor. Phyllis and her husband, **Ray**, reside within a stone's throw of the station, allowing her to enjoy a leisurely walk to and from the site every day.

In the accompanying photo, **William Carroll**, Station Manager, presents a \$25.00 U.S. Savings Bond to **Paul Mauzy**. Paul won the bond as the result of the drawing that took place in Headquarters to promote participation in the Corporate-wide Savings Bond drive. Paul and wife **Connie** were very appreciative—they had recently become the parents of their first child, a daughter.

The Etam CEA held its annual picnic the end of July at Camp Horseshoe Recreation Area, near Parsons, West Virginia. It turned out to be a really beautiful summer day, and the gathering participated in such outdoor sports as softball, horseshoes, swimming and "suds dispensing."

P. J. (Mike) Moore, former COMSAT employee, has given up his position as Construction Engineer at the Etam site for "E" Systems and returned to Florida.

Of local interest: **Dean Parsons**, son of **Mr. & Mrs. Roger Parsons**, was awarded the Sportsmanship Trophy for the Southern Squad in the Annual North/South Shrine Football

COMSAT NEWS JULY-AUGUST 1975

Game in Cumberland, Maryland; **Paul Helfgott** accompanied a local troop of Boy Scouts to a week of camping in Canada; **Spencer Everly** is the new owner of a Cessna 150 airplane; **Mike Britner** has recently been elected to the Rowlesburg Town Council; and, **Carl Cooper** has been elected President of the Cooper Family Reunion which will be held at Parkersburg, West Virginia, in August.

—Bev Conner



Paul Mauzy, left, receives savings bond from Station Manager Bill Carroll.

PAUMALU. **Charles N. Ogata**, Station Controller, represented COMSAT aboard the APOLLO-SOYUZ recovery ship, *U.S.S. New Orleans*. Charlie (circle, below) was on board the carrier for the entire mission, assisting Western Union International and General Electric personnel in the TV coverage of the splashdown in the Pacific and the recovery of the APOLLO astronauts.

Normally, the summer months are a period when work activities usually quiet down. Such was not the case this summer at Paumalu. Instead, there was a flurry of work projects that kept station personnel literally jumping. A major project was the reloca-

tion of the TTC&M equipment which had previously been isolated from the main control and equipment areas. Its relocation into the main equipment room, adjacent to the main control room, will improve operational efficiency and ensure adequate expansion capability for the TTC&M facilities. Several months of planning by Headquarters and station personnel went into the planning with actual work in the project begun August 4 and completed, to include testing and return to service, on August 10. **Ken Yamashita**, Station Engineer, coordinated the relocation assisted by **Eddie Miyatake**, TT&C Supervisor. **Nick Diavatis** and **Joe Bulko** from Headquar-





Bill Osborn gets help from Julie Miyatake in drawing for a winner of the skateboard at CEA picnic.

ters provided engineering support.

Other projects currently in progress or completed recently include: preparations for the removal of two RTT



Eddie Miyatake gives a turn to the Hawaiian delicacy, *pulehu he'e*, as Stan Holt and Ken Yamashita cook hamburgers for annual picnickers.

transmitters at Paumalu 1 and the installation of an REL 1188 transmitter in their place; preparation for the receipt and installation of a MARISAT 8.4 meter antenna system; preparation for the receipt and installation of a 15-foot antenna for special COMSAT Labs testing; major repairs to the RSI polarizer at our transportable antenna; relocation of the scope terminal within the main equipment room; and modifications to our Paumalu 1 anten-



Tom Ota receives bond

na system to support GSAT operations. Additional projects are on the drawing board which will keep us busy well into 1976.

Tom Ota, Sr. Electronic Technician at Paumalu, is pictured receiving a \$25 Savings Bond from Station Manager **Glenn Vinquist** as a winner of one of three bonds awarded by the Corporation during the recent Bond Drive.

PLAZA. **Mary Lane** of the Orbital Mechanics and Data processing Division recently returned from a two



Mary Lane and group prepare to enter desert.

tour which proved both interesting and hazardous. The tour included visits to the historic cities of Athens, Beirut, Cairo and Rome. The ride from the Lebanese airport into the City of Beirut provided Mary and her fellow tourists with a view of a Palestinian refugee camp. The hazardous part of the trip was, of course, Beirut, where barricades were set up on the deserted, army-patrolled streets, and where each morning she was awakened by the sound of machine gun and mortar fire.

Scheduled trips to the ancient Biblical Cities of Damascus, Sidon and Tyr had to be cancelled as the situation in Beirut worsened and the group was confined to the hotel. In Cairo, the interesting highlights were the Pyramids of Giza and the Sphinx, and the Cairo

However, it was not "All work and no play" at the Station. The Paumalu CEA picnic held in early August at Kualoa Park was enjoyed by station personnel and their families. Our appreciation goes to the CEA's 1975/76 officers for its success: President **Stan Holt**, VP **Paul Motoyama**, Secretary **Leonard Nagashima** and Treasurer **Yoshiaki Daikoku**. Games Chairman was **Bill Osborn**.

—Glenn Vinquist

Museum which houses King Tut's treasures and the mummies of the Egyptian pharaohs.

Valeria Russ has joined the Public Information Office as a summer intern. A native of Panama City, Florida, Val is a journalism major at Howard University. In addition to her scholastic workload she has worked as a reporter for the University's publication, *The Hilltop*. At the end of the summer she will return to Howard for her final year.

—J.J.P.

ED. NOTE: **Gloria Lipfert** of Analysis and Traffic, Room 6206, Tel. Ext. 6695 will be writing the Plaza column in the future. Material for inclusion in this column may be submitted to Mrs. Lipfert directly or to the Editor, COMSAT NEWS.

Era Ends at Cape

(continued from page 2)

sounding names were accredited, too: Iron Annie; Leaning Chimney Press; Independent Florida Alligator; and finally, just plain Florida Alligator.

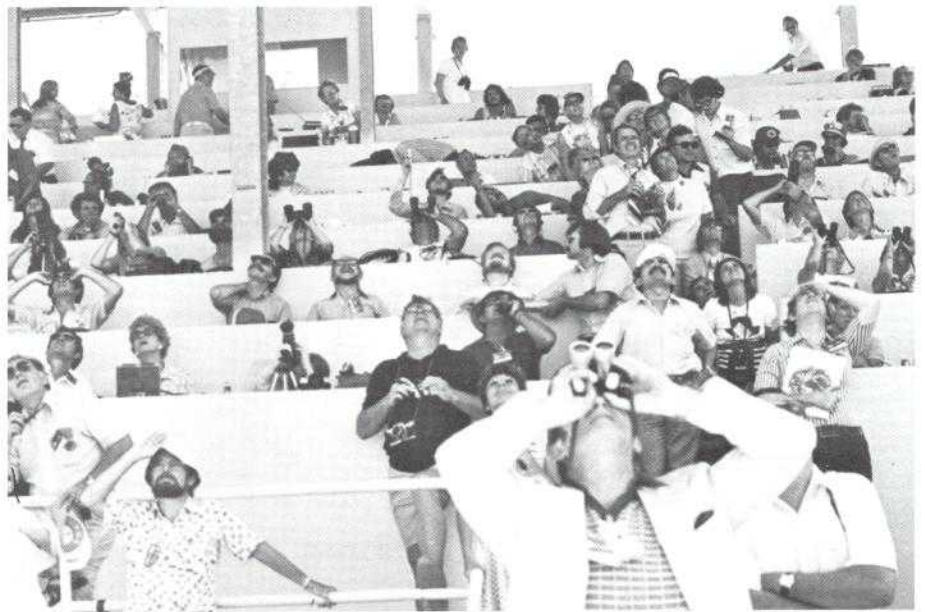
Launch day

The traffic several hours before launch, scheduled at 3:50 p.m. EDT, seemed to indicate that crowd predictions might be realized. One portion of the trip to the launch site, that on a normal day would take 30 minutes, took one hour and 20 minutes on launch day. The weather had cleared and the day was hot and bright encouraging "bird watchers" to head for the Cape to get a closer look at the historic event.

Throughout the area, air-borne traffic 'copters were reporting long lines of cars, campers and buses headed for the Cape area. At Titusville, across the Indian River from the launch site, the river shore had turned into a giant parking lot miles long.

At 3:50 p.m. EDT—right on schedule—the Apollo thundered off, thrust upward on a white plume for its space-age mission of detente. Bobbing in the blue waters of the Banana and Indian Rivers around the Space Center with an obstructed view of the launch were about 600 boats, according to the marine patrol. Some were rafted together, cocktail flags flying.

After the launch, some bird watchers around the Cape area cracked open fresh six-packs and thermos jugs



At launch all eyes follow the "bird" as it lifts from the pad, gains momentum, and roars into the blue Florida sky.



Mark Ross of the *London Daily Express* and Vic McElheny of the *New York Times*, left and right, follow the lifting spacecraft intently.

after the launch, wisely letting the traffic surge in all directions before heading out. Those in a rush had planes to catch (many didn't catch them), or parties to attend (many missed them). Traffic boiled (word used advisedly) to a crawl on all out-bound arteries.

But for some, the spectacularly successful launch was a bitter-sweet victory.

Some parties were not in the pink

Indeed, some post-launch parties turned blue over the color pink, for pink was the color of slips handed out to some contractor members of the launch team.

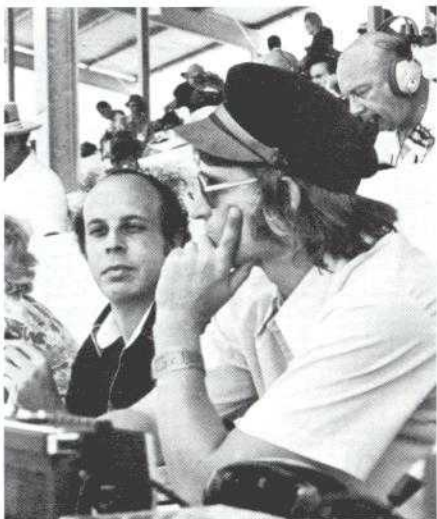
After having heard words of tribute, those launch team members returned to their respective companies, knowing full well what was coming but not knowing exactly how it would feel. But some were to find out soon.

In spite of the bad news, spirits were reasonably high, though somewhat subdued. The post-launch parties were still a tradition. Hanging over the various gatherings was concern for tomorrow—families, bills, mortgages, etc. Compassion and spirits helped to ease the pain for the moment but tomorrow was an unknown, uncertain path.

By about 8:00 p.m., most of the traffic had cleared the county. Florida Highway Patrol officials "guestimated" that the total crowd in the area had not touched the one million mark



At the press site a sea of parked cars form the backdrop for photographers following the progress of the last Apollo.



Glenn Singer and Bob Robinson, left and right, of the Cocoa Beach *Today* listen attentively to pre-flight announcements over the public address system.



The launch site scene would not be complete without veteran space reporter May Bubb's mission creation.



Then, at the press site, there's the newsman who takes being called a clown literally.

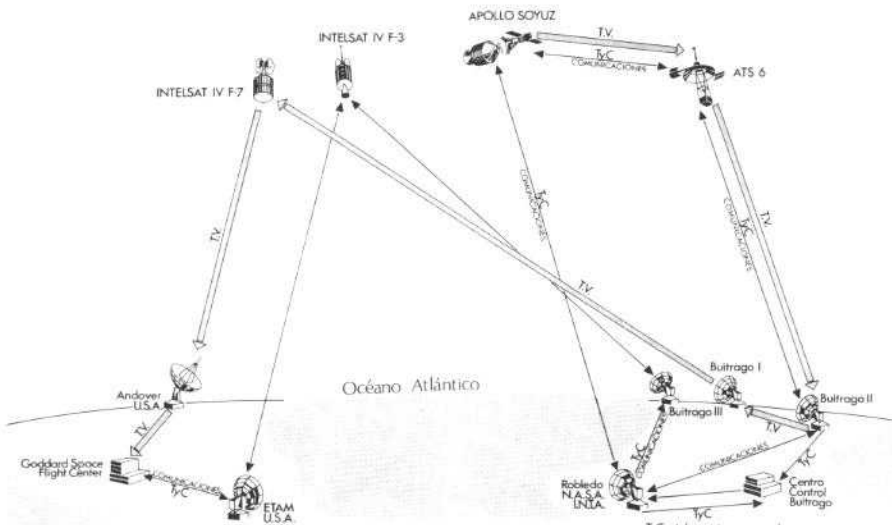
but instead, was 600 thousand to 750 thousand, boosted at the last minute by the break in the weather.

Overhead, in their fifth orbit, the APOLLO astronauts found that a native Floridian had stowed away in

their spacecraft. Astronaut Vance Brand reported that a healthy mosquito was flying around in the command module; "... understand you're going to feed him to the fish," capsule communicator Dick Truly said. Brand responded, "... bring them back alive

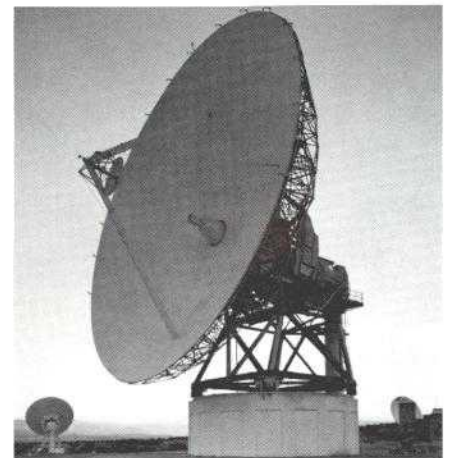
and give him a pair of astronaut wings."

As the post-launch parties faded away, overhead the Florida moon shone bright. Indeed, this had been a day to remember.

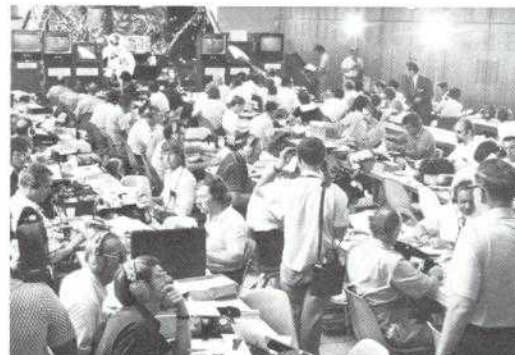


ENCAMINAMIENTO DE LAS COMUNICACIONES PROYECTO APOLLO-SOYUZ PARTICIPACION DE LA E.T.S. DE BUITRAGO - C.T.N.E.

The chart above, provided by Compañia Telefonica Nacional de España (CTNE), demonstrates the flow of traffic between the NASA ATS-6 satellite and the Apollo-Soyuz spacecraft during the joint mission. The antenna, located at Buitrago near Madrid, received live TV signals during the two days the space vehicles were joined and served as an alternate link for telemetry and command. TV signals received by Buitrago 2 were forwarded by INTELSAT satellite to Andover, Maine, to the Goddard Space Flight Center in Greenbelt, then on to Mission Control in Houston. More than 44 hours of live TV were received from Apollo-Soyuz by CTNE's Buitrago which, in addition, provided a number of data and conventional circuits to Moscow and the usual communications support to the NASA network.



Buitrago 2, the conduit between the ATS-6 satellite and the Atlantic Ocean INTELSAT IV satellite.



later with the enactment of the Communications Satellite Act of 1962, even though an international system of global communications had been called for a year earlier by both Presidents Dwight D. Eisenhower and John F. Kennedy and endorsed later the same year by the United Nations. In 1965 INTELSAT's EARLY BIRD was launched, paving the way for the global network as it exists today.

Ten years later the combination of the American approach to open reporting in manned space flight and the sophistication of the global satellite system resulted in the international coverage of an event never before witnessed by newsmen or worldwide audiences.

The result: on July 17, 1975, as the televised image of the SOYUZ launch came in to the NBC studio housed in Houston's Mission Control, unaffected by government censorship or limited communications capabilities, one had to take note that

at the time, in addition to the more than 500 representatives of the press gathered at the Johnson Space Center, there were approximately 2,000 at the Cape and a contingent in Moscow which included 76 accredited American reporters.

With only a split-second transmission lapse the picture was released in Moscow and in Houston, from communications centers in Germany, Italy and London, distributed throughout Europe by EBU and BBC and throughout the Soviet Union by INTERVISION. Into this framework was injected the capabilities of the INTELSAT system, making it possible for people at the far reaches of the globe to witness this "first" in space adventure.

Joined in Space

Command Module Pilot Vance D. Brand, with the aid of a sextant, first sighted the SOYUZ a little after 9 a.m. on July 17. The Soviet spacecraft was estimated to be 220 nautical miles distant with the two ships closing at about four to four-and-one-half miles a minute. As the spacecraft maneuvered into position for docking, within range of the NASA tracking station in Santiago, Chile, the television camera inside APOLLO began recording the joining of the two vessels and sending the transmissions through the ATS-6 satellite to the Spanish Earth Station in Buitrago for further relay to Houston by the INTELSAT IV communications satellite poised over the Atlantic Ocean, then to Moscow and a waiting worldwide audience.

At 12:12 p.m. the APOLLO and the SOYUZ docked and for the next 42 hours, through the joint exercise and final undocking, there were 18 periods of television transmissions between the spacecraft and the two countries with the ATS-6, the 94-foot Buitrago

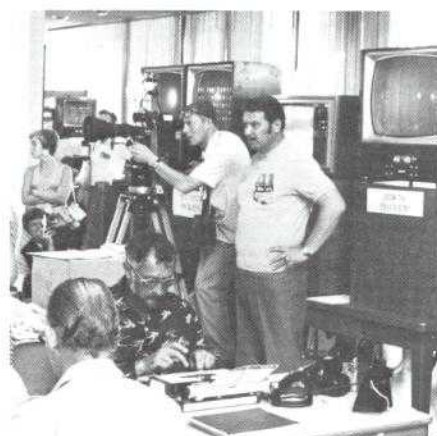
During key periods of activity the three wings of the Visitors Center used by the news media echo with the furious pounding of typewriters, on-the-spot broadcasting and the shouting of stories over long distance telephones.

antenna, the Atlantic Ocean INTELSAT IV and COMSAT's Andover Earth Station serving as the key links in the chain of communications.

According to the JSC News Center's calculations, almost 30 percent of the nearly 35 hours the two crews worked together was televised. Depending upon the time of day, TV watchers around the world were able to witness the two spacecraft come together, the first handshake, the heads of the two government commend the crews, the exchange of gifts and mementos, formal dining, guided tours for Russians and Americans, the conducting of experiments, a press con-



At the extreme left, Soviet Information Specialists respond to a query from a reporter.



Resembling newsmen everywhere, a camera crew from Popular Scientific Studio in Moscow, the largest of its kind in the Soviet Union, films activities in the News Center.



Anxiously watching live TV coming into the Houston Control Center are the key decision makers on the American side of the Apollo-Soyuz mission, left to right: Astronaut Eugene A. Cernan; Glynn S. Lunney, ASTP Technical Director for the U.S.; Chester M. Lee, ASTP Program Director; and George M. Low, Deputy Administrator, NASA.

ference, and the farewells and final undocking.

The urgency of time does not allow for the exact totaling of numbers of viewers and receiving countries before this magazine goes to press, however, as an example, aside from the United States and the Soviet Union, a report of the European Broadcasting Union (EBU) dated July 19 included among those receiving television transmissions from EUROVISION (the European network): Algeria, Austria, Bangladesh, Belgium, Canada, Denmark, Finland, France,

Great Britain, Iran, Ireland, Israel, Italy, Ivory Coast, Japan, Jordan, Luxembourg, Libya, Morocco, Netherlands, Norway, Pakistan, Portugal, Spain, Sudan, Sweden, Switzerland, Tunisia, Turkey, Yugoslavia, West Germany and Zambia.

Another TV First—By Satellite

On Monday, July 21, at 6:51 a.m. EDT., through commercial communications channels with the INTEL-SAT system of satellites and earth stations bridging oceans, a world audience for the first time saw a manned SOYUZ space vehicle glide on its single parachute to a dust-raising impact in a wheat field approximately 34 miles northeast of the town of Arkalyk in Central Kazakhstan, a little more than 300 miles from its launch pad at the Baikonur Cosmodrome. As with the launch of SOYUZ, the televising of its landing was a first for the people, including the Soviet people, anywhere.

Three-and-one-half days later the

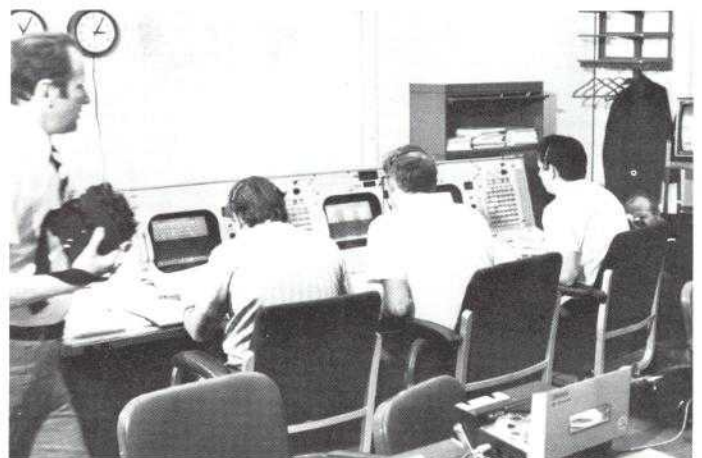


On the fringe of the news operation, visitors pour into the Center's theater to watch the televised mission while kids remain kids, seemingly awe-struck by the Lunar Landing Module exhibit.

APOLLO spacecraft plummeted through the earth's atmosphere to a watery landing approximately 345 miles west of Hawaii at 5:18 p.m. EDT. As the cone shaped Command Module floated to the sea carrying its three-man crew under its three red-and-white striped parachutes, cameras aboard the U.S. Navy helicopter carrier *New Orleans* picked up the gently floating spacecraft, sending the pictures out over a shipboard antenna to the Pacific Ocean INTEL-SAT IV to the COMSAT-operated earth station at Jamesburg, California, for further transmission to the Houston Space Center. From



Dr. Sergey D. Grishin, Deputy Director of the USSR Mission Control Center and head of the Public Information Group from the Soviet Union, center of table, performed the role of Information Officer in the Soyuz Newsroom.



In Building 30, adjacent to Mission Control, documentation specialists of the USSR scan computerized readouts during the mission.

Houston the televised landing was distributed nationally by network television and to a worldwide audience over the commercial satellites.

As the World Watched

The list of achievements charged to man's exploration of space are many, with their importance determined by one's own interests and interpretations. But world interest designates specific milestones and during the period in which man pushed back the perimeter of space, two stand out—man's landing on the moon, the flight of APOLLO 11, and the joining in space of the ships of the two major space powers, the flight of APOLLO-SOYUZ. In both, the satellites and earth stations of the global system made it possible for the world to be there.

APOLLO-SOYUZ TV Traffic

Germany/Spain/U.S. Links

July 15-24, 1975

Incoming:

Germany to U.S.: Transmit and Receive Time - 99:34 hours.

Spain to U.S.: Transmit and Receive Time - 84:18 hours.

Outgoing:

U.S. to Germany: Transmit and Receive Time - 111:38 hours.

U.S. to Spain: Transmit and Receive Time - 00:36 hours.

Mission Traffic

July 15-24

Region	Transmit Time	Receive Time	Total
Atlantic Ocean	172:03 hrs.	190:10 hrs.	362:13 hrs.
Pacific Ocean	7:31 "	8:07 "	15:38 "
Indian Ocean	6:42 "	12:20 "	19:02 "
Worldwide Total			396:53 hrs.

Mission Related Traffic

January-July

Atlantic Ocean	210:06 hrs.	228:13 hrs.	438:19 hrs.
Pacific Ocean	9:23 "	9:59 "	19:22 "
Indian Ocean	6:42 "	12:20 "	19:02 "
Worldwide Total			476:43 hrs.

In Reflection . . .



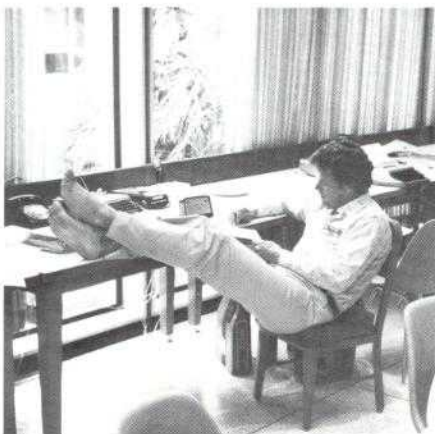
there were those who had a time zone difference . . .



an early morning broadcast . . .



were just on call . . .



and whose feet hurt.

COMSAT NEWS JULY-AUGUST 1975

But not to be overlooked was the innovative newsman. Keith Lyne of Canadian TV operates his radio station-away-from-home which he designed, built and named, "Goes-in Goes out." His instrument enables him to monitor one or two incoming feeds (in the case of Apollo-Soyuz, Mission Controls in Houston and Moscow), record all voice



inputs and broadcast simultaneously with the flip of a switch. Battery operated, the unit requires no external power input. Lyne has been covering space flights since 1966.

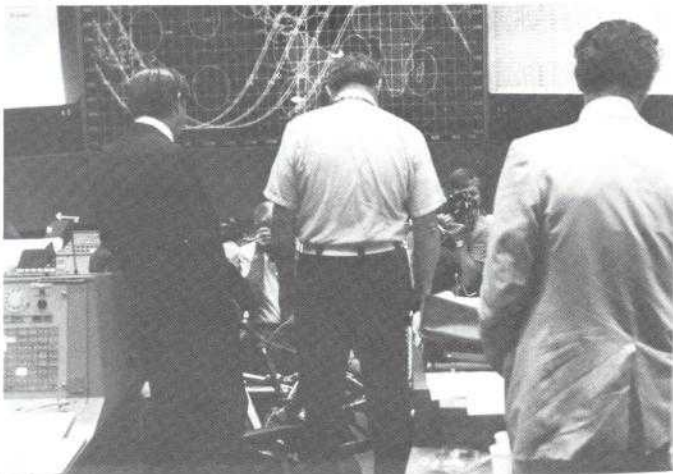
There were details



NASA Headquarters' manned flight Information Officer Bill O'Donnell, center, makes his rounds of the back rooms to insure the needs of the wire services have been met.



Sandi Carnegie and Bob Asmand had the responsibility for directing the NBC effort in their temporary studio.



A probe similar to the one creating a docking problem for the two space-ships is brought into the Control Center for engineers to analyze. The problem was corrected.

Live via satellite . . .



1. The hatch separating the Docking Module and the Soyuz is unlocked . . .



2. and opened for the passing of enthusiastic greetings . . .



3. after which the crews receive words of congratulations from President Gerald Ford and Soviet Chairman Leonid Brezhnev.

With the Raisting earth station playing a major role in communications during the APOLLO-SOYUZ mission, we requested a historical piece to be included in our post-flight report on the mission. The following story was prepared by Johannes Adolphs of the Raisting earth station.

Raisting, a Link Between Two Worlds

BY JOHANNES ADOLPHS

Wherever you dig throughout south or west Germany you are bound to come across ancient graves or foundations. So it is no surprise that our little village of Raisting, located 30 miles southwest of Munich, has quite a history. For example, some years ago an old cemetery dating to the late Bronze Age was found at the foot of the microwave tower linking Raisting with Frankfurt.

More is known about the Roman Age when the Romans came across the Alps and added the south and west of Germany to their empire. The Romans did not build the great buildings for which they were noted here but you can still see their monuments constructed without the use of cement in Trier where, in the center of the city, traffic flows around or through Roman arches.

During the Roman period Raisting was the crosspoint of two main roads, one of which led north from Rome and goes directly by our station.

When the Romans withdrew from Germany the Bavarian history of Raisting began. In the eighth century Bavaria was colonized, developed by monks, and monasteries were built giving the region the name "Pfaffenwinkel" meaning "Priests Corner". In the year 776 Raisting was first mentioned in the old chronicles, consequently, it will celebrate its 1,200th anniversary next year.

With the monks came Christianity. Since the monks were obviously French the church of Raisting got its name from the Bishop of Rheims in France, St. Remigius.

Medieval Raisting was governed by two monasteries, Wessobrunn and Diessen, until they were dissolved by the government. However, prior to its being dissolved, the monastery of Wessobrunn had been the center of architecture and for the craftsmen who built numerous famous churches all over Europe.

These craftsmen were masters in stucco and painting. They brought in the Baroque architecture and their stucco resembled marble. After hundreds of years the stucco work on the buildings is still in excellent condition. They also built the church in Raisting in the seventeenth century.

Although the monasteries were dissolved in 1803 they still have their influence in the life of the people. Some were rebuilt and have become famous for their beer, home-made butter and cheese, and recently, one got first prize for its cattle. The value of the handwritten books, libraries and educational programs, unfortunately lost when the government dissolved the monasteries, is beyond estimation.

Raisting then became predominantly a farming village. In 1892 a railway was built linking Raisting with the small neighboring towns of Diessen

and Weilheim. With the coming of satellite communication a site was needed to receive satellite signals. Raisting was chosen because of its geographic location, its rail and road routes, and its shelter from terrestrial microwave links.

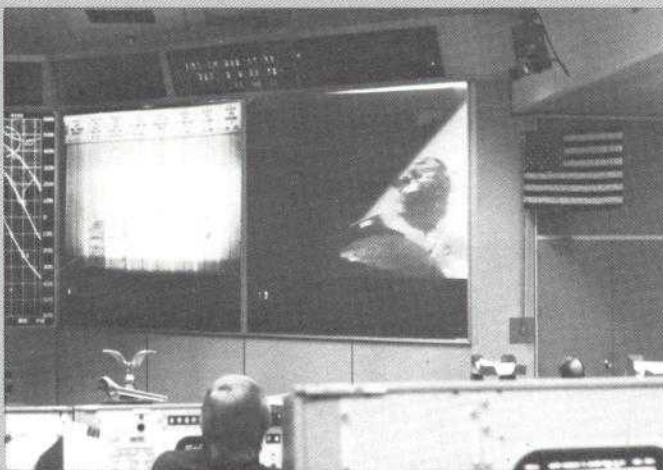
Today's Raisting is an agricultural and cattle raising region. A small factory produces trailers for carrying wooden trunks. But its biggest attraction for the visitors to Raisting is the earth station with its huge antennas. But even the shadows from these large antennas cannot escape history. The little chapel of Saint John, a place of pilgrimage for hundreds of years and considered one of the oldest churches in upper Bavaria, with a foundation dating back to the fourth century, stands in the shadow of antenna number two.

As the old Roman Road makes its way past our three antennas and the chapel of Saint John and threads toward Rome, the early center of world civilization, the Raisting earth station representing modern civilization reaches into the sky, tying Germany by satellite to the rest of the world. Those of us here in Raisting hope this means of communications will make for better understanding between nations and people and will set an example of cooperation useful to world peace.



Shortly before noon Saturday, July 19, the Apollo and Soyuz spacecraft completed a final undocking. In this sequence, taken in real time in Johnson Space Center's Mission Control, flight controllers watch as the two vehicles undock and go their separate ways. The live telecast was transmitted from the Apollo Command Module, through the NASA ATS-6 satellite to the Buitrago Earth Station near Madrid, then over the Atlantic Ocean INTEL-SAT IV (F-7) to the COMSAT operated earth station at Andover, Maine, and on to Houston Mission Control.

PHOTOS BY JOHN PETERSON



September/October 1975

Volume I Number 1

Pathways

SATELLITE

LAB RECORDS

COMMUNICATIONS SATELLITE CORPORATION
COMSAT GENERAL CORPORATION



Pathways SATELLITE

September-October 1975
Volume I Number 1

PATHWAYS is published every other month by the Public Information Office, Communications Satellite Corporation, COMSAT Building, 950 L'Enfant Plaza, S.W., Washington, D.C. 20024. Phone AC 301, 554-6104 or 6105.

Editor

John J. Peterson

Photography

Allan W. Galfund
James T. McKenna

STAFF CONTRIBUTORS

Allan W. Galfund
Larry G. Hastings
James H. Kilcoyne
James T. McKenna
Edgar Bolen-Production

PUBLICATION ADVISORS

COMSAT

Joseph V. Charyk
President
Lucius D. Battle
Senior Vice President
Corporate Affairs
Robert B. Schwartz
Secretary and Director
of Public Information
Stephen D. Smoke
Manager, Publications
Lawrence Weekley
Manager, Media Relations
and Information Services

COMSAT General

Fred W. Morris
Vice President
Corporate Development
Hale Montgomery
Director of Public Affairs

A member of the International Association
of Business Communicators.

Cover

An artist's drawing of the Algerian Domestic
Satellite System.

From the President

Ten years ago, in June 1965, Early Bird linked the United States and Europe with the world's first commercial communications satellite pathway.

Today much more advanced satellites stationed over three oceans provide 380 pathways among 64 countries with satellite earth stations.

Including service through terrestrial extensions, there are now 523 user-to-user satellite pathways.

Much of COMSAT's remarkable history has been chronicled for employees and friends by COMSAT News, first published as a four-page newspaper in April 1966 and subsequently converted into a news magazine.

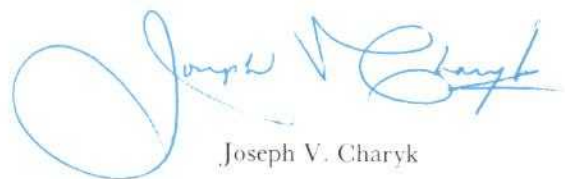
In that first issue, I expressed the hope that COMSAT News would help all of us better understand the history, operations and goals of the Corporation and, thereby, contribute to the fullest realization of our potentials as employees and individuals.

I believe that COMSAT News has achieved these objectives with professional distinction.

As we embark on the second decade of commercial service, it would seem appropriate to broaden the scope of the title of the magazine to reflect the new programs in which COMSAT General, our wholly owned subsidiary, is engaged, as well as our ongoing programs to expand global system services.

These programs involve the establishment of satellite pathways: to other nations, within the United States, and to vessels at sea and aircraft in flight.

We believe the name, Pathways, serves as the common denominator in the new horizons COMSAT and COMSAT General are seeking to reach in the decade ahead. Pathways will, of course, continue to report employee and business news, but it will include a larger variety of feature stories as well. We hope that you will find the new format, the news presentation and the feature articles both interesting and informative.



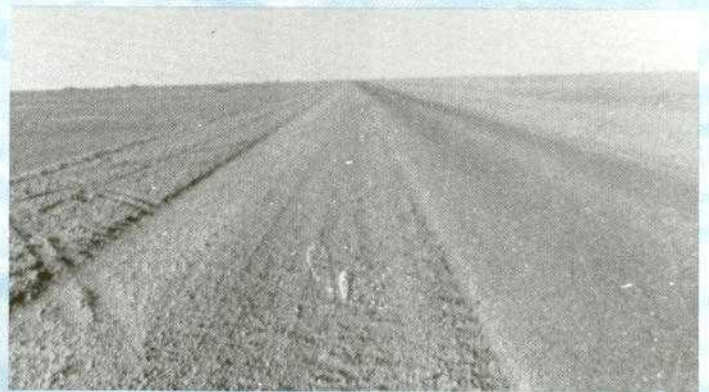
Joseph V. Charyk



Bringing Algeria together . . . By Satellite

BY JOHN J. PETERSON

Age-old dream of opening a dialogue between all Algerians to be realized with system capable of surmounting the obstacles of time, distance, geography and climate.



By the end of 1975, Algeria, with its population of more than 13 million people scattered over approximately 114,000 square miles, will realize a centuries-old dream with the completion of a domestic satellite system allowing Algerians the length and breadth of this North African republic to communicate with one another.

Second in size only to the Canadian domestic system, TELESAT, the Algerian system will consist of 14 small earth stations capable of looking at either the Atlantic or Indian Ocean INTELSAT satellites, receiving and transmitting varied types of communi-

cations, both national and international, throughout Algeria.

The expertise of COMSAT GENERAL, which numbers among its technological feats carrying the world soccer matches into the Brazilian Amazon and assisting in the establishment of an internal communications system in Saudi Arabia, has again benefited a country desirous of establishing a dialogue with its people but unable to do so because of such reasons as geography, climate or technical complexities.

As pointed out by Vasant N. Sawant, Advisory Services, COMSAT GENERAL, the domestic satellite system was the only practical route to go in establishing a national communications capability. The few HF links in

being at the time were not very reliable for several reasons including geography and climate. Estimates on the installation of microwave links in the Sahara Desert ranged in excess of 40 million dollars. As it turned out the total cost to Algeria for both the international and domestic satellite systems was but a fraction of this amount. From the viewpoints of practicality and cost consciousness, the domestic system was the most logical way to meet Algeria's communications needs.

"Initially," said Sawant, "it was intended that the system would be strictly between the individual regions and the capital city of Algiers. What we have done, however, is to introduce a simplified demand assignment

Mr. Peterson is Editor of Pathways.

method providing not only two-way traffic between the regions and Algiers but also between regions. To the stations we've added the TV transmit and receive capability.

"Actually, the development of the system goes back a step further," continued Sawant. "Originally, our contract with the Algerian Government was for consultation services for the construction of one large earth station to be used for international satellite service. However, Mr. Abdelkader Bairi, the present Director of Telecommunications Equipment for Algeria, envisioned a much greater use of satellite communications in solving some of his country's problems. He had been involved in satellite

require large numbers of COMSAT GENERAL personnel but rather small teams made up of members large in expertise. For example, the advisory group team for the Algerian domestic system was made up of Sawant, Richard J. McBride, Lewis V. Smith, William F. Ferguson, Elias C. Perez and Philip M. Caughran.

With administrative matters settled it was necessary, as a first step, that sites be selected for the erection of the 11-meters-in-diameter stations. An eight-man site selection team moved into the Sahara Desert among whom was COMSAT GENERAL's Perez. He and his companions would spend almost 10 days covering thousands of kilometers over the vast desert.



Known as "The City of 1,000 Cupolas", El-Oued, situated on the border between Algeria and Tunisia, is one of the earth station sites of the new domestic system.

communications and associated with INTELSAT for many years and recognized its potential for Algeria.

"So, from the early, one-station, international concept, the service contract grew into a combination both international and domestic in scope. Not only will Algeria be tied into the rest of the world but Algerians will be able to communicate with other Algerians throughout the country. The Ministry of Posts, Telephones and Telegraphs at present anticipates approximately five or six hours a day of TV service from Algiers to each of the 14 locations. In addition to this, of course, there will be the usual telephony, teletype, telex and facsimile service."

Typically, advisory services in the establishment of such a system do not

"Frankly," said Perez, "selecting a site was more of a determination as to whether the pre-selected locations met the requirements for successfully installing the stations. We then made an on-the-spot inspection of each of the sites to confirm this and to select the best site in cases where there was a choice. To give an example, a town in a region being considered for a station generally had a PTT facility already in operation and with it, or in the vicinity, a local telephone exchange, a post office, an available source of power and nearby living facilities. Some had a high frequency radio station nearby. In most cases the basic elements were already there, which is a considerable advantage; it's almost the same as being able to install the station in your back yard.

"There were characteristics of the more developed countries that we didn't have to worry about," continued Perez. "Since the stations were going to be located in the desert we didn't have to worry about radio interference and natural or artificial shielding. Nor did we have to concern ourselves with problems such as expanding industry or population density in the foreseeable future since the nearest neighboring community was probably several hundred kilometers away."

Since the site selection team included government representatives as well as COMSAT GENERAL and General Telephone and Electronics, the contractor who would actually do the construction work, the decision to accept a site could be made on the spot once the team agreed on the feasibility of a specific location. The next step for the team was to gain the support of the local government for the station's needs for water, power, labor, contractual support and housing for technicians involved in the station installation and subsequent operation. Perez recalled the response of the local governments was excellent, including offers to expedite housing to accommodate expected technical personnel.

"To be perfectly frank about it," said Perez, "we were surprised to discover that we had completed the selection process on 10 sites in nine days during which we covered about 4,000 miles. Believe me, there was little time for sightseeing.

"With the Ministry of Posts and Telecommunications looking after us we had little difficulty with accommodations which varied from modest rooms in the smaller towns to air-conditioned comfort with swimming pools at the resorts and larger cities. Our conferences with the regional authorities were hospitable, and we were given friendly and generous treatment. There were many instances of this. During the evening of our visit to Tindouf we were invited to a cultural exchange program featuring folkloric music and singing by a family group from Mauretania. In another instance, which I still regret missing because of our extremely late arrival, we were to have been treated to a barbecue Algerian style."

Fortunately or unfortunately, Perez

observed, progress is having its impact in Algeria. Between Ain-Salah and Tamanrasset there is a 700-kilometer stretch of unpaved road called the "piste" which draws the would be racing enthusiast like a magnet. With no limit but that determined by the vehicle, on the "piste" the speedster can put his automobile, motorcycle or landrover to the test. To the dismay of these daredevils, civilization has reached the "piste" with the road being paved and speed limits expected to follow.

"We also found some pleasant surprises in the desert," continued Perez. "Actually, the desert is quite fertile in some spots requiring only water to produce an abundance of fresh vegetables and fruits such as tomatoes, artichokes, lettuce, radishes, dates and the like. Unfortunately, one does not find our equivalent of the roadside stand.

"Although it's not uncommon to travel hundreds of kilometers and count on one hand the number of cars on the road, vast stretches of highway with no signs of habitation or life, you really don't have to worry about becoming stranded out in the middle of nowhere if you stick to the road. A motorist is required to file something similar to a flight plan when traveling a long distance between communities, registering with the authorities on arrival or departure. If you become overdue they come looking for you. They have a healthy respect for the desert.

"When you come from an urban society in which people sort of look out for themselves and tend to ignore others," concluded Perez, "it's unusual to find yourself in one in which people look out for each other. You find this in the desert, people depending on each other in their common struggle for survival. We had car trouble at the midway point between Bechar and Tindouf. We had expected to find a motel and restaurant open but they were closed. We were 400 kilometers from the closest city. Fortunately, there happened to be a Public Works Department group working on the road. When they found out about our difficulties—we were about out of gas and had no food—they couldn't do enough for us. One of their mechanics made temporary repairs on our car, the super-



After hundreds of kilometers of barren desert the site selection team gives right of way to a camel caravan.

visor had his cook prepare food for us, then gave us enough gas to reach our destination. They would accept no compensation from us other than the gas coupons to replace the gas they had given us. Yet, they didn't think they were doing any more than abiding by the unwritten law of the desert."

Actual construction work is contracted to GTE (General Telephone and Electronics), a United States firm, which performs site preparation, equipment selection and acquisition, construction and testing and whose responsibility includes getting the stations operational. Bill Ferguson, COMSAT GENERAL's "man on the scene", has, in the last two years, spent a major portion of his time in Algeria, monitoring the schedule and contract performance for COMSAT

GENERAL and the Algerian Ministry.

"Whereas the site selection team encountered little difficulty with language differences, primarily because of its size and composition, once involved in the overall effort, one did run into some problems," said Sawant. "The workmen and engineers who have been associating over the years have enough of a working knowledge of each other's language to get along. But as you move out of the populated and industrial areas, out of the cities if you will, the differences become increasingly difficult and simply boil down to the fact that you understand French or you have problems."

Most Algerians attended schools under the French system with French the primary language taught. The effort is presently being made to



Nature yields to man as even the formidable Sahara gives up part of its domain to make way for a modern hotel.



Custom and religion are binding forces to the inhabitants of this North African country with mosques similar to this one in the desert dotting the Algerian landscape.

make Arabic the common language, according to Sawant. Radio stations throughout the country offer programs in Arabic, promoting this effort for both the young and the old.

"An interesting aspect of the language difference is that, with the coming of national communications to Algeria, the problem of foreign languages might just be replaced by one of dialects," continued Sawant. "Just as in the United States we have learned to adjust to the different dialects in moving from one part of the country to another, with the introduction of instant communications to Algeria there will be a dialogue established between let's say, coastal and inland Algerians who, for all practical purposes, have had no direct dialogue before. Consequently, an understanding problem could arise which could prove just as inconvenient as the language difference."

Over the years it has become apparent to the COMSAT GENERAL engineers that Western influence is having its effect on Algerian culture. Sawant recalls staying at the Hotel Saint George in Algiers a few years earlier and finding it difficult to talk with anyone in English. Returning now, he finds the same people making a special effort to converse in English, recognizing, that western influence is significant enough to require a certain adaptability.

"There are changes one must make in one's lifestyle also," noted Sawant. "It's almost impossible to find an

apartment so you usually wind up living in a hotel. And this is not as easy as it sounds because hotels are not that numerous and those there are usually full because of tourists and many other foreign businessmen. Then you just don't drive up to a hotel in a taxi and go in and register as you would in our country or Western Europe. Chances are that if arrangements have not been confirmed locally for you by a responsible person, as from the Ministry of P and T, you could wind up back in your taxi.

"Most of the food is European style but if you want other kinds of food you can get it. If you had a taste for pizza you could find it; it might not be the same as you were accustomed to in your favorite pizzeria, but you'd get pizza. Actually, the only special kinds of foods available would be Arabic, Cous-Cous, special kinds of soups or other local delicacies the names of which I can no longer pronounce. But the French influence is apparent even on the streets. In America the common sight is the hamburger or hot dog stand. In Algiers, it's the Algerian walking along the street with a yard-long loaf of bread tucked under his arm or riding a bicycle with the loaf of bread attached."

Sawant pointed out that the cost of living in Algeria keeps pace with American prices. Three meals a day could cost \$25 to \$30 even practicing economy, with a hotel room \$25 a day. Apartments, if they could be found, might be a little cheaper but, at the same time, would lack some of the conveniences Americans are accustomed to. One advantage to living in Algiers is the ability to stay in reasonably good physical condition. Most of the city is built on hills and wherever one goes it's usually on foot and it's up one hill and down another. Physical exercise is a way of life.

Service over the domestic system was begun in March 1975 with three stations transmitting TV from Algiers to Bechar and Ouargla. The official inauguration of the system took place on July 24, 1975, at a ceremony attended by Algerian dignitaries including President Boumediene. COMSAT GENERAL was represented by Donald R. Owen and Sawant (until recently, Owen was Director of the Technical Services Division with responsibility for Technical Assistance contracts).

The remainder of the domestic system is expected to be completed by the end of the year. In the meantime, Algeria is entering into negotiations for a second international antenna system and considering expanding its domestic system with continued technical assistance provided by COMSAT GENERAL anticipated.

Editor's note. The assistance of Vasant N. Sawant and Elias C. Perez of COMSAT GENERAL's Technical Services Division in providing material necessary to the writing of this feature is appreciated.

The expanding Global Satellite System

The INTELSAT IV-A Series

THE NEW SATELLITES

The first of the new series of communications satellites, the INTELSAT IV-A (F-1), was successfully launched from Cape Canaveral, Florida, at 8:17 p.m. EDT, Thursday, Sept. 25, and placed in its synchronous orbit over the Atlantic Ocean the following evening. The new satellite is scheduled for service in the Atlantic Ocean Region early in 1976.

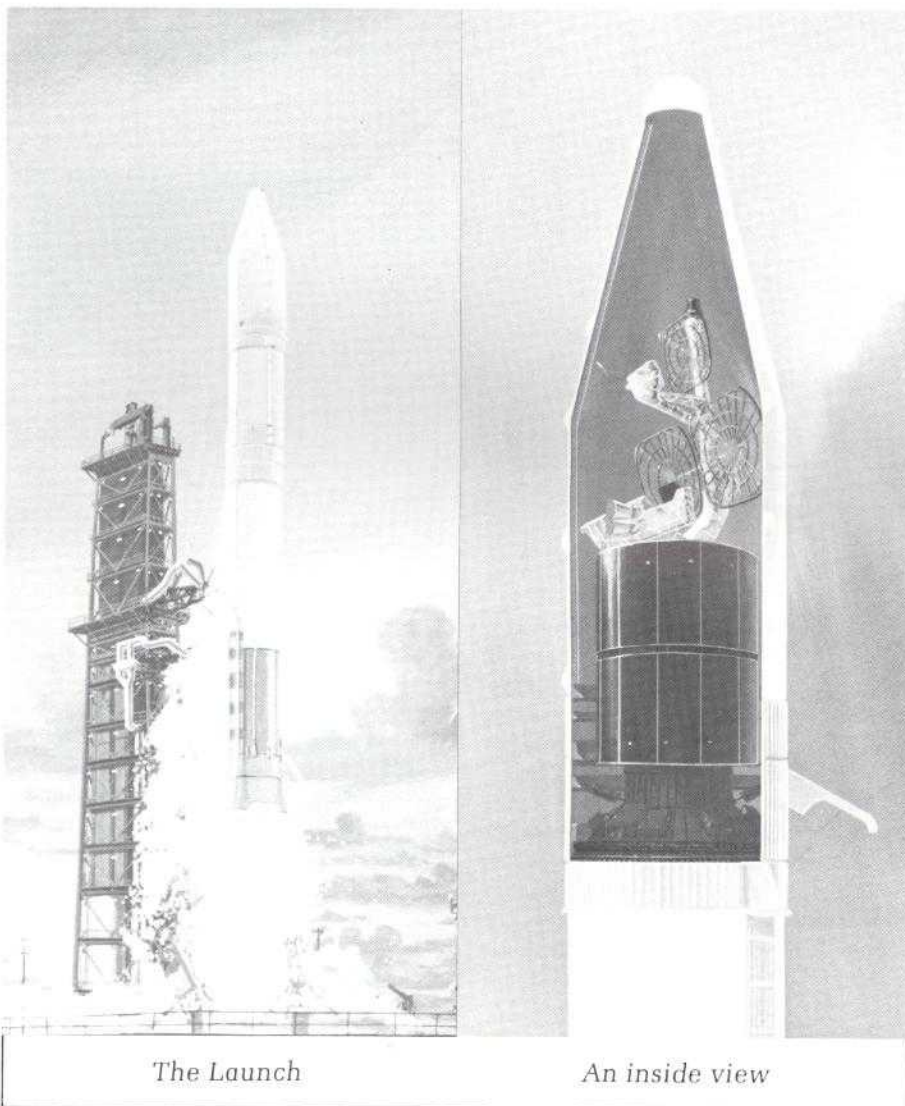
The INTELSAT IV-A satellites introduce another advance in satellite technology to expand the global system's communications capacity, versatility and flexibility.

The new satellites have a capacity of about 6,250 telephone circuits plus two TV channels, a capability about two-thirds greater than the predecessor INTELSAT IV series. The increased capacity advance is achieved by a new antenna design.

By using shaped-beam antennas coverage of land masses is provided on both sides of the Atlantic basin. Beams focused on the eastern and western hemispheres are isolated, permitting the same frequency band to be used twice. This innovation doubles the use of the frequency spectrum and, accordingly, increases the satellite's communications capacity.

There are six satellites scheduled for the INTELSAT IV-A program. Two

A reproduction from the pamphlet recently published by the Public Information Office.



The Launch

An inside view

An Atlas-Centaur rocket used to launch the INTELSAT IV-A's into space from Cape Canaveral, Florida.

were scheduled for launch beginning in late 1975 and three are scheduled for launch beginning 1977.

The advances in satellite technology incorporated into each of the five generations of INTELSAT satellites can be summarized, as follows:

INTELSAT I (EARLY BIRD), the world's first commercial communications satellite, was placed in service in June, 1965. It established the first satellite pathway between the United States and Europe. It made live transoceanic TV possible for the first time.

The INTELSAT II satellites, placed over the Atlantic and Pacific Oceans during 1967, introduced a multipoint communications capability and extended satellite coverage to more than two-thirds of the world.

The INTELSAT III satellites established the global system when placed in service over the Atlantic, Pacific and Indian Oceans in 1969. They also introduced the simultaneous transmission of all forms of communication — telephone, television, telex, data and facsimile.

The INTELSAT IV satellites, placed in service between 1971 and 1975, further expanded the global system. They made it even more flexible and versatile, and introduced the spot beam concept, a concentration of satellite communications capability on small areas.

Now, the INTELSAT IV-A satellites take spot-beam technology one step further. They apply to it frequency reuse to conserve the limited bands allocated for sharing by satellite and terrestrial communications.

HOW FIVE GENERATIONS COMPARE

Satellite Series	I	II	III	IV	IV-A
Two-way voice circuits	240	240	1,500	3,750	6,250
Television channels	1	1	1	2	2
Design life (years)	1½	3	5	7	7
Repeaters (transponders)	2	1	2	12	20
Electrical power (watts)	31	85	127	500	700
Bandwidth (each transponder) MHz	25	126	226	36	36

THE GLOBAL SYSTEM

A major portion of all international communications and more than two-thirds of all transoceanic communications are now going by satellite.

The satellites in the global system, operating over the Atlantic, Pacific and Indian Oceans, are owned by the International Telecommunications Satellite Organization (INTELSAT). More than 90 countries are members of INTELSAT. Communications Satellite Corporation (COMSAT) represents the United States.

The earth stations, which operate with the satellites, are owned and operated by governments or telecommunications entities in the countries where they are located.

The use of satellites has increased rapidly since the first satellite pathway was established between the

United States and Europe in 1965. Today, there are about 400 satellite pathways among some 70 countries, territories or possessions, and more than 100 countries are leasing satellite circuits on a full-time basis.

COMSAT is the largest user of the expanding global system, accounting for about 30 percent of the system's use. COMSAT derives its revenues from communications satellite services it provides to the U.S. communications common carriers (the international carriers). They serve the public between the U.S. and foreign points and between the 48 contiguous states and certain offshore U.S. points.

COMSAT provides its services through the satellites of INTELSAT and through U.S. earth stations. COMSAT has an ownership interest of about 30

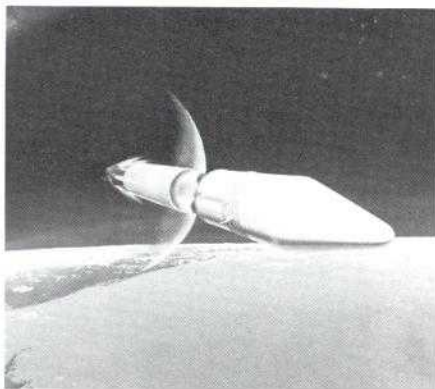
percent in INTELSAT and an ownership interest of 50 percent in the U.S. earth stations.

COMSAT provides its services in many different ways. Satellite circuits can be leased on a full-time basis, or as needed. TV channels are available for regular service and occasional use.

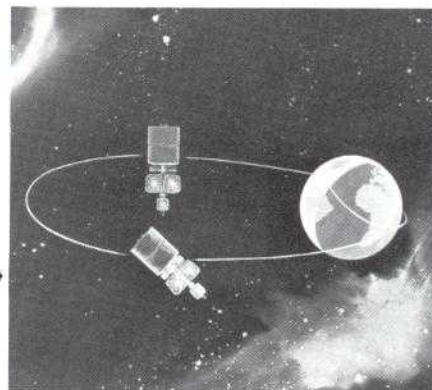
Although TV transmission represents the most dramatic use of satellite services, it represents only about one percent of COMSAT's revenues.

More than 95 percent of all of COMSAT's services are provided on a full-time basis. The largest portion of traffic, by far, is for telephone, accounting for about 80 percent of COMSAT's services. Another 15 percent of the traffic is for message and data transmission, the so-called record services.

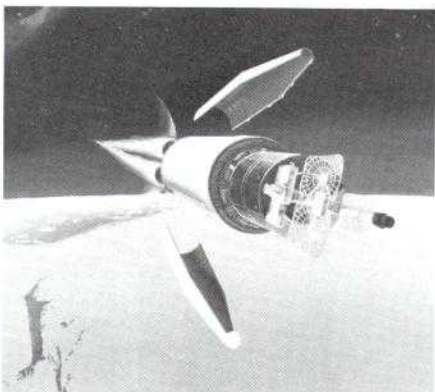
From Launch . . .



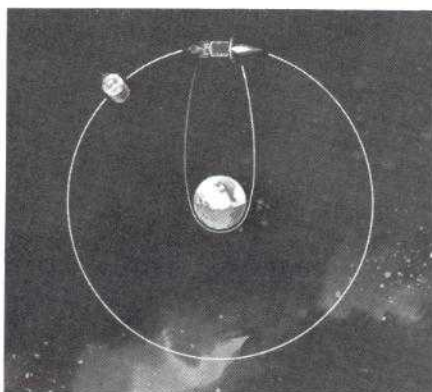
1 Following two minutes and 20 seconds of flight the Atlas booster engines are shut down and jettisoned. The sustainer engine continues to burn until the Atlas propellants are exhausted, approximately four minutes after liftoff. After sustainer engine shutdown, retro rockets on the Atlas are fired to separate the first stage from the Centaur which carries the INTELSAT IV-A spacecraft.



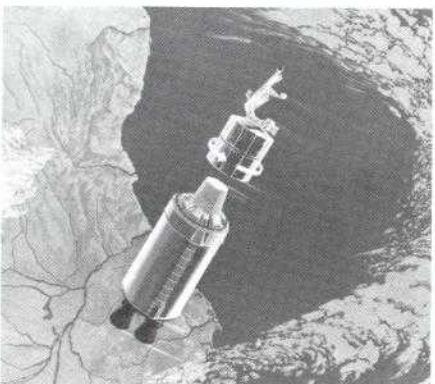
2 Separation of the spacecraft at approximately 28 minutes and 34 seconds after liftoff initiates a spin-up sequence. The spin-stabilized INTELSAT IV-A is now in an elliptical transfer orbit with a perigee of 341 miles and an apogee at the synchronous altitude of approximately 22,240 miles.



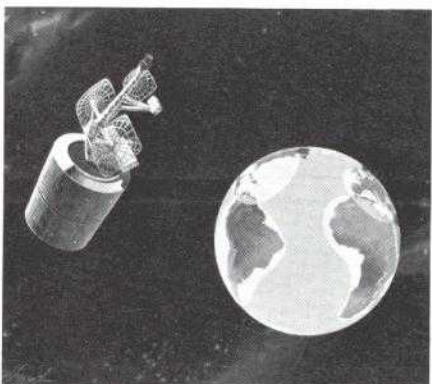
3 Approximately four minutes and 20 seconds after the launch, or about 10 seconds after Atlas-Centaur separation, the main engines of the Centaur stage are ignited. At four minutes and 31 seconds into the flight the nose fairings, which thus far have protected the satellite, are jettisoned.



4 The satellite is functionally checked out and reoriented, as necessary. As the satellite reaches an apogee in its transfer orbit, the INTELSAT Spacecraft Technical Control Center in the COMSAT Building, Washington, D.C., directs the firing of the apogee motor to circularize the orbit. It is then reoriented so its spin axis is parallel to that of the earth.



5 The Centaur's main engine cutoff, called MECO, occurs approximately 10 minutes and 21 seconds after launch. The engines shut down and a 15-minute coast period follows. Then, approximately 25 minutes into the flight, the main engines are restarted for a burn of one minute and 20 seconds. The spacecraft has been injected into its transfer orbit and separated from the Centaur.

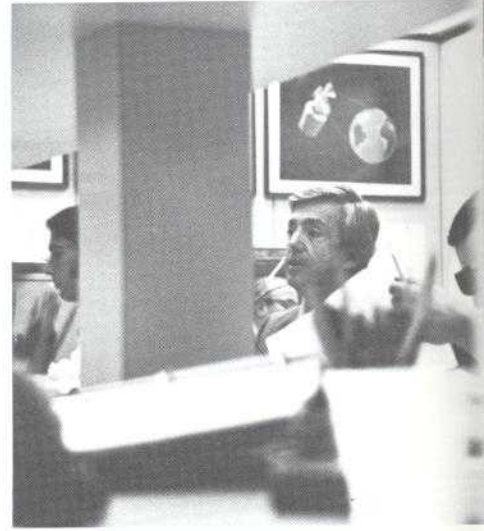


6 Now the satellite is in a near-circular path over the equator at an altitude of about 22,240 miles. With its orbital period synchronized with that of the earth's rotation at a preselected point over the Atlantic, Pacific or Indian Ocean region, the INTELSAT IV-A satellite is ready to provide communications service.

to Synchronous Orbit .



*COMSAT's Spacecraft
Technical Control Center
during the launch of the
INTELSAT IV-A.*



Satellites provide new and faster method to carry marine seismic data

BY
DAVID W. LIPKE AND
ANTHONY A. BERGAMINI

Satellites stationed 22,300 miles in space may speed the search for oil in the depths of the seas.

COMSAT GENERAL Corporation is studying the possibility of a high speed data (HSD) service, utilizing the new MARISAT Satellite System, to meet the need for faster and more efficient transmission of seismic data.

As outlined by COMSAT GENERAL at a recent industry seminar, the HSD service, tailored to meet requirements of the industry, could involve a double-hop satellite path: from ship via MARISAT to shore, then a second hop if necessary via a domestic U.S. satellite to small receive-only stations sited at or near the customer's premises. Alternatively, the U.S. domestic leg could be routed via existing terrestrial facilities. The service is ideally suited for the offshore exploratory industry.

Oil producers have intensified their efforts in exploring the offshore areas of the world. Extensive geophysical surveys and analyses are made before the costly process of exploratory drilling is begun. Billions of bits of recorded seismic data are processed through sophisticated computer programs before the results can be interpreted and a decision made to begin costly drilling operations.

The present means of transporting this data to its destination is to unload magnetic tapes at dockside, then crate them for further inland shipment. The logistics of international shipments and clearance through customs may add to complications and delays.

Now, modern satellite communications could prove to be the answer to the problem of communicating seismic data more efficiently.

Seismic data could be carried in

binary bit streams through satellite channels from the vessel and interconnected to any existing communication network. Massive quantities of data could be moved instantaneously from the point of collection to any onshore compatible communication terminal.

The primary elements of the communications system consist of satellites and associated terminal facilities. HSD from a ship terminal would be transmitted through a MARISAT satellite to either the Southbury, Connecticut, or Santa Paula, California, shore station. Then, the data could be relayed via a domestic satellite system to receive-only terminals located near the user's computer center, or moved to its destination via existing domestic terrestrial facilities.

To accommodate HSD, higher performance would be required in the shipboard terminals, and additional equipment would be necessary in the shore stations to code, modulate and control the incoming data stream.

When the ship terminal was not being used for HSD transmission it could be used for routine voice and teleprinter communications in exactly the same manner as any other ship terminal in the network.

COMSAT GENERAL is considering the feasibility of providing the HSD service on a subscription basis. A tentative hourly rate has been established for the baseline system covering the transmission from the customer-owned ship terminals through a double satellite hop to a receiving point at or near user locations. Alternate or additional points of reception would depend upon market requirements. Landline extensions beyond established receiving stations and specially required control lines are not included in the tentative rates.

Subscribers would establish their own committed annual usage; no maximum levels have yet been set but minimum annual commitments are expected to be established. The committed usage will be scheduled in

minimum transmission periods of three hours and reserved on a first-come, first-served basis. First priority will be given to service-committed usage before any service will be available for time in excess of committed usage. The transmission periods will be reserved by ocean on a monthly basis in a manner to facilitate reasonable access to all subscribers.

Some of the benefits of an HSD service include:

Control of the time span between the collection of data and its reception at onshore computer centers. Computer scheduling could be improved by minimizing possibility of idle time and/or reducing backlog.

Intrinsic value of having analysis of data available on a prompt or near-real-time basis.

Ship management could be improved to redirect surveys while the vessel was still near location.

Improved vessel utilization could be realized by eliminating the need to return to port to unload collected magnetic taped data. Marine seismic explorations could continue as long as maintenance and crew tolerance permitted.

Direct transmission from ships would eliminate risk of loss in the shipment of tapes and allow reuse of onboard tapes once the data is transmitted.

In general, it is believed that an HSD communication service—a COMSAT GENERAL innovation—could reduce the overall time and money spent for exploration and development, or permit more intelligence to be collected for the same input. Communications via satellite could be a new link in the long chain of services, skills and energies that help bring oil from wells to consumers.

Anthony A. Bergamini, Director, Financial Services, COMSAT GENERAL, is charged with the development of rates and tariffs applicable to COMSAT GENERAL.

David W. Lipke, Director, Mobile System Planning, COMSAT GENERAL, has had technical responsibility for much of the MARISAT System concept and its innovative design.

Aetna third partner in domestic satellite venture

Aetna Casualty & Surety Company, COMSAT GENERAL and IBM have advised the FCC that Aetna plans to join COMSAT GENERAL and IBM as the third partner in a venture to establish a domestic satellite communications system.

In a letter to the FCC, the companies outlined a proposed structure for the venture under which each of the companies intends to become a one-third owner. This will comply with the "balanced CML" option set forth in the FCC's order of February 10, 1975, which specified that no partner should own less than 10 percent or more than 49 percent of the venture.

If the FCC approves the forthcoming system applications, IBM will purchase a 42½ percent ownership interest in the venture; Aetna will purchase a 15 percent ownership interest and COMSAT GENERAL will hold the remaining 42½ percent. Aetna will provide additional funds, through the purchase of a convertible note, to bring its investment to the same level as COMSAT GENERAL and IBM. The convertible note will be guaranteed by COMSAT GENERAL and IBM.

Aetna will have the option, which must be exercised by the time the satellite system becomes operational, to convert its debt into an additional ownership interest or longer term debt not guaranteed by COMSAT GENERAL and IBM. If Aetna elects to convert to equity, it will have a full one-third ownership interest. Until exercise of the option, Aetna's contributions of funds will be allocated between equity and debt to maintain its 15 percent ownership.

The three partners will have equal participation in the Board of Directors of CML from the date Aetna first becomes an owner.

COMSAT GENERAL and IBM have advised the FCC that they are concerned that some provisions in the Order handed down on February 10 might make the domestic satellite venture unacceptable. The new partnership will ask the FCC to clarify these

Appointed to Presidential Commission

Lucius D. Battle, COMSAT Senior Vice President, Corporate Affairs, is one of three persons appointed by President Ford to be members of the National Study Commission on Records and Documents of Federal Officials. The other two appointees were Herbert Brownell, a New York City attorney, and Ernest R. May of Belmont, Mass., a professor of history at Harvard University. Philip W. Buchen, former member of the Board of Directors of COMSAT and presently counsel to the President, was appointed to be a member of the Commission. The President also announced his intention to designate Brownell, Attorney General in the Eisenhower Administration, as Chairman upon his confirmation by the Senate.



provisions when the FCC responds to the system applications. These applications will describe the business plans, system design and the relationship among COMSAT GENERAL, IBM and Aetna.

After FCC approval of the system applications, and as the operational satellite system develops, the three partners will each invest up to \$55 million (a total of \$165 million) in the venture.

Frank T. Cary, IBM chairman, and Joseph H. McConnell, COMSAT

chairman, said in a joint statement, "We welcome Aetna's participation and believe it will make a valuable contribution to the business and financial management of the satellite venture."

Aetna's chairman, John H. Filer said, "We believe satellite communications will become a key service area in future business communications and offer significant growth and profit potential. We are enthusiastic about the opportunity to participate in this emerging technology."

Metzger receives IEEE award

Sidney Metzger, COMSAT Assistant Vice President and Chief Scientist, right, is presented with a silver Bowl by John J. Kelleher, Chairman of the EASCON Board of Directors, upon receiving its Government-Industry Service Award for 1975 for "Outstanding contributions to the advancement of aerospace electronics technology." EASCON '75, jointly sponsored by the Institute of Electrical and Electronics Engineers' Washington Section and the Aerospace Systems Society, was held recently in Crystal City, Virginia.



PHOTO BY ALLAN GALFUND

PATHWAYS

New VP to direct COMSAT General's business development and public affairs



Renee Chaney, WGMS announcer, hosts COMSAT show.

COMSAT sponsors radio program

Music from lands and regions served by the global satellite system is featured on a weekly radio program sponsored by COMSAT.

The program, "A World of Music", is broadcast each Wednesday from 8:05 p.m. to 9:00 p.m. on WGMS (570 AM and 103.5 FM).

Host for the program is Renee Chaney of the WGMS announcing staff. During the intermissions she interviews COMSAT and INTELSAT officials and guests representing countries served by the INTELSAT global system. A number of Ambassadors to the United States will participate with messages welcoming the program to the music of their countries.

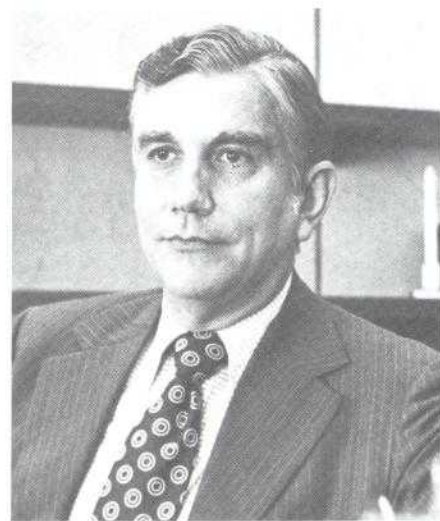
For the first program, on October 1, Dr. Joseph V. Charyk, COMSAT President, was the guest and music of the U.S. was featured. Norway was the second country on October 8, followed by Italy on October 15, West Germany on October 22, Australia on October 29, Chile on November 5, Denmark on November 12, Iran on November 19, and Mexico on November 26.

Fred W. Morris, former President and Chief Executive of TRT Telecommunications Corporation and Tele-Sciences Corporation, has been elected Vice President, Corporate Development, and a Director of COMSAT GENERAL Corporation.

Mr. Morris will direct activities involving business development, planning and public affairs in COMSAT GENERAL. In announcing his election, John A. Johnson, President of COMSAT GENERAL, said the move completes a reorganization of several divisions of the company begun in July.

A resident of Washington, D.C., Mr. Morris served in executive telecommunications positions in industry and government for many years. He was Vice President of Corporate Planning and Special Assistant to the President, Radiation, Incorporated, of Melbourne, Florida, and Washington, D.C.

In 1967-68, he was a member of President Lyndon Johnson's Task Force on Telecommunications Policy, and earlier was Associate Director of Telecommunications Management Executive Office of the President. He



served as a technical officer during World War II and, later, as civilian electronics specialist with the U.S. Army Signal Corps. He was an Assistant Professor of Electrical Engineering at the University of Southern California.

Mr. Morris is a registered professional engineer, a graduate of the California Institute of Technology, and was recently honored with a Doctor of Science degree.



WGMS announcer Chaney tours Operations Center with COMSAT President Joseph V. Charyk.

PHOTOS BY ALLAN GALFUND

INTELSAT Board approves

three-satellite Atlantic plan

Twenty-four Governors representing sixty-three of the ninety-one Signatories attended the Seventeenth meeting of the Board of Governors, held in Washington, D.C. The Board is now comprised of twenty-five Governors representing seventy-three Signatories, since three new groups have been formed of Colombia/Ecuador/Peru, Venezuela/Chile/Bolivia, and Iran/Korea (Republic of)/Pakistan/Turkey.

Among its actions the Board:

Technical and Operational Matters

- Decided that a three satellite configuration using an operational spare will be implemented in the Atlantic Region during 1977-79; and that the configuration after 1979 shall provide for the continued use of earth stations constructed to meet the 1977-1979 plan, by using either three fully operational satellites or two satellites plus an operational spare.

- Requested the MSC to review optimal orbit locations, including capabilities for attracting new services, and report to the BG/PC.

- Requested the MSC to prepare alternative implementation plans for the Atlantic Region during 1979-1985, taking into account alternatives outlined by the BG/T, and assuming the following factors: implementation of the agreed plan during 1977-1979; introduction of an INTELSAT V in 1979 or later time frame; use of the new Traffic Data Base derived from the Athens Global Traffic Meeting; completion of TDMA field trials in 1979, with subsequent approval for the operational use of TDMA/DSI in the Atlantic; and varying degrees of and timetables for the operational introduction of TDMA/DSI. The alternative Atlantic Ocean Region plans, together with alternative implementa-

tion plans for the Indian Ocean Region in 1977-1985, are to be completed in time for BG/T review and presentation to the May, 1976, Board Meeting.

- Requested that alternative implementation plans for the Pacific Ocean Region during 1977-1985 be prepared for consideration after the plans for the other regions.

- Requested the Advisory Committee on Finance to report by the May, 1976, Board meeting on alternative policies which could be used to determine charges for the operational use of TDMA/DSI in the INTELSAT system.

- Decided that if INTELSAT IV-A (F-1) is successfully launched as the Atlantic Primary satellite at 335.5°E, INTELSAT IV-A (F-2) will be launched for service as the Atlantic spare at 330.5°E. The INTELSAT IV (F-3) will be relocated to 325.5°E, as the major path satellite, the INTELSAT IV (F-7) will be relocated to 340.5°E, as the spare and the INTELSAT IV (F-2) will be moved to 359°E, for possible use as required. When the three-satellite configuration using an operational spare is implemented, the Board will review these locations.

- Approved assumptions and a schedule for studies of INTELSAT requirements during 1986-1993.

- Authorized the MSC to negotiate with Telespazio and OTC(A) contracts for the provision of TTC&M services after 1975.

- Approved, as an exception to current policy, the dissemination on a nondiscriminatory basis of large scale integrated chip technology being developed by the MSC under the INTELSAT R&D program. Such technology will be made available to industry without charge for both INTELSAT and non-INTELSAT purposes.

- Authorized the Secretary General

to modify the agreement with Norway for lease of one-half a transponder, to change the date for commencement of service from October 1 to December 31, 1975, and noted that the U.S. intends to continue lease of one transponder in the Pacific until at least March 31, 1976.

- Approved new procedures to govern approval, verification and operational control of earth station access to and operation with INTELSAT satellites.

- Approved continued access to the space segment by two Saudi Arabian non-standard earth stations which will be relocated from Jeddah and Riyadh to Abha and Buraida to provide domestic services on a single destination carrier to the Riyadh standard station. This approval is subject to a rate adjustment factor of 2.5 for telephony services; normal rates for television provided satellite power is not increased, and verification of the performance characteristics of the stations. The stations are to provide domestic services via INTELSAT for up to two years, commencing in February 1976 and subject to MSC approval for operation, after which time the services will be transferred to domestic terrestrial facilities.

Legal and Financial Matters

- Authorized an insurance program for INTELSAT consisting of: coverage of \$100 million for liability to third parties; coverage at replacement costs for loss or damage to INTELSAT property, INTELSAT IV-A spacecraft in storage, spacecraft in transit when INTELSAT is at risk, and for launch vehicle loss or damage and launch delay [at a premium for INTELSAT IV-A (F-1) through (F-6) of \$0.15 per \$100 of replacement costs]. The Board decided not to obtain insurance coverage for the artwork collection.

- Approved revisions to the 1975 MSC budget as follows: a \$7,737,000 reduction in the MSC 1975 capital contract budget, an \$858,000 increase in the departmental budget; and reductions of \$107,000 in R&D contract authorizations and \$457,000 for R&D contract expenditure budgets.

- Approved a revised task list for use by the MSC, and authorized the use of subtasks as appropriate and as agreed by the MSC and the Executive Organ.

- Decided that current charges for occasional use of television and associated audio services shall be extended to INTELSAT IV-A satellites, and amended the definition of a unit of utilization so that it applies to use of all satellites including the INTELSAT IV-A.

- Decided that previously approved guidelines for division of costs of Board or Committee Meetings away from INTELSAT Headquarters should also be applied to Operations Representatives and Global Traffic Meetings unless there is no host Signatory, in which case INTELSAT will bear the costs.

Administrative and Organizational Matters

- Approved one year assignments with the Management Services Contractor's Laboratories staff for: Mr. Remy Edy, a nominee of the French Signatory; Mr. Keith Bagot, nominated by the UK. Signatory; and Dr. Jonathan Mass, nominated by the Signatory of Israel. Five positions are currently available for Signatory nominees.

The Eighteenth Meeting of the Board of Governors will be held November 19-26, in Washington, D.C.

The preceding report was prepared by Eleanor Alberstadt of the U.S. INTELSAT Division.

**Thanks to you,
it works for all of us.
Give to your
UNITED WAY**

Smithsonian and INTELSAT sign agreement



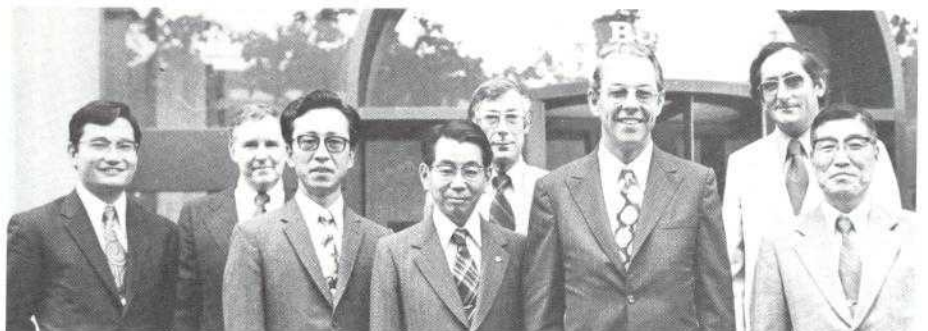
Mr. Michael Collins, Director of the Smithsonian's National Air and Space Museum, left center, and Mr. Santiago Astrain, Secretary General of INTELSAT, right center, meet to sign the agreement for the loan of three communications satellites to be part of the Air and Space Museum's 1976 inaugural display. Present at the ceremony were Richard R. Colino, Assistant Vice President, U.S. INTELSAT Division, U.S. Governor on the INTELSAT Board and currently Vice Chairman of the Board (extreme right), and Fredrick G. Durant III, Assistant Director for Astronautics of the Museum (extreme left).

More than 40 countries see Ali/Frazier bout

The heavyweight championship fight between Muhammad Ali and Joe Frazier was carried live by satellite from the Philippines to more than 40 countries over the global communications network.

Two earth station antennas near Manila, Tanay Nos. 1 and 2, beamed coverage of the bout around the world, utilizing seven television channels in four INTELSAT satellites located over the Atlantic, Indian and Pacific Oceans. In several instances double-hop connections over two ocean regions provided service to receiving countries.

KDD's Endo returns to Tokyo



Martin J. Votaw (3rd from right), Vice President, INTELSAT System Management Division, bids farewell to Eizo Endo (far right) former manager, Satellite Communications Research Office of Kokusai Den Shin Denwa Co., Ltd. (KDD) who is returning to his home office in Tokyo after several years of duty in Washington, D.C. Others in the group are (left to right) Kazumasu Kabayama, assistant in the KDD Washington office; Neil Benedict; Eiichi Isomura, assistant; Harvo Watanabe, who replaces Mr. Endo as Manager of the KDD Washington office; Robert Kinzie; Mr. Votaw; Len Dooley and Mr. Endo.

PHOTO BY ALLAN GALFUND

BY J. L. MCKENNA

Engineer/war refugee

reunited with family



"My family called right here at the office," Nguyen Ngoc Lan said.

How would you like to swiftly leave your native land, bound—you believe—for the U.S., while your wife and three children, who have previously fled in another direction, end up on another continent, without your knowing where they are?

A Vietnamese engineer, Nguyen Ngoc Lan, now working for COMSAT GENERAL as a transmission analyst, faced those circumstances this spring and summer.

Thanks to college days' ties that began as a student-professor relationship Lan had kept up with Dr. Pier Bargellini, Senior Scientist at COMSAT Labs, he was able to secure his COMSAT GENERAL job 39 days after being airlifted from Saigon's Tan Son Nhut Airport.

Now living in an Alexandria apartment, Lan is hopeful his wife, Tang Thi Trinh, an adopted 13-year-old daughter, and their own two sons, ages three and one, will soon be able join him.

He learned in mid-July, 89 days after he put them on a commercial flight from Saigon to Bangkok, Thai-

land, that they were staying with friends in Paris.

COMSAT's Senior Vice President for Corporate Affairs and former diplomat, Lucius D. Battle, has contacted diplomatic sources seeking to expedite the paper work to get Lan's family to the U.S.

"As the fighting moved closer to Saigon, things became so uncertain," Lan said, that he and his acupuncture-practicing wife decided the family should leave. The big problem, how-

ever, was that his wife held a French passport, which also included their children, but Lan had no such document.

They decided it would be best if she and the children went to Thailand, leaving "me free to better move around," Lan said.

His family flew from Saigon on April 17, and a week later Lan ended up at the same international airport, seeking to become a part of the mammoth airlift already in operation.

"I stayed on a tennis court next to an airport terminal for a day, but was never able to sleep," Lan said. On April 25, he managed to get aboard an airlift flight.

Lan was set to go to work for COMSAT once before, in the summer of 1969, while a Ph.D. student at the University of Pennsylvania, but his exchange visitor's visa expired. He was unable to get it renewed, and he was forced to return home under the so-called Vietnamization program.

He had come to the U.S. six years earlier as a 19-year-old to study at the Milwaukee School of Engineering.

The family in Paris, from left, wife Tang Thi Linh, sons Linh and Long and daughter Stella.



Mr. McKenna is a COMSAT Information Officer.

He proceeded to earn his bachelor's degree at the University of Florida and his master's at Penn, both in electrical engineering. At Penn, Dr. Bargellini served as Lan's advisor and their friendship began.

When Lan returned to Vietnam in 1969, he worked in telecommunications engineering for a firm doing work for the Vietnam Telecommunications Authority, and in executive engineering management for Caltex (Asia) Ltd., a petroleum firm. He continued to correspond regularly with Dr. Bargellini.

After leaving Saigon this spring, Lan called Dr. Bargellini, whom he says he looks upon "like a father or an uncle," when his airlift flight left him off in Guam. There for 10 days, Lan contacted Dr. Bargellini again when he arrived at the Viet Refugee Center, Camp Pendleton, California.

Meanwhile, Dr. Bargellini circulated a memo on May 14 to COMSAT's executive staff advising of Lan's status and availability. Lan flew to Washington on May 29, Dr. Bargellini met him at the airport and took him home as his house guest. Lan was hired later that week by Robert D. Briskman, Assistant Vice President for Fixed Systems for COMSAT GENERAL. He's now working for Gomaa E. Abu-Taleb, Manager of Transmission Systems.

After starting his work here and living temporarily in Vienna, Virginia, through arrangements made by Jack Rutter, COMSAT General's Personnel Manager, Lan set out again to contact his family.

In fact, Lan said, "I never really stopped. I'd been working on it since before leaving Saigon but everything was so confused."

He sent letters to numerous people, but they were either returned to him, or the responses produced no solid information or the few leads turned out to be fruitless.

Meanwhile, his wife was trying to trace him down. "She had better success," Lan exclaimed. On July 15, while he was working at his third floor desk, the phone rang.

It was a reunion that came so unexpectedly, yet so welcome. Eighty-nine days of uncertainty vanished with it, even quicker than she and the children had vanished into the sky, flying away from him.



NOTES FROM PERSONNEL

The Job Evaluation Program, which got underway at the beginning of the year, is now well on its way to completion.

A Nonexempt Job Evaluation Committee began holding meetings in late Spring and has completed its evaluations of most nonexempt positions. Initially evaluating approximately 100 "benchmark" positions, the Committee is currently evaluating all other nonexempt positions.

A second Job Evaluation Committee began meeting in mid-summer and has completed half of the exempt benchmark positions. The remaining benchmark positions were to be evaluated by the end of October at which point salary ranges will be recommended for use in 1976. The Committee will continue evaluating until exempt positions through approximately present Grade 41 have been incorporated in the new system.

The Job Evaluation Committees, Exempt and Nonexempt, are comprised of representatives from major elements of the corporation. The Exempt Committee includes Jim Potts, Milt Nomkin, Bill Carroll, David Nye, John Gantt, Lou Pollack, Bob Barthle and Carl Reber. The Nonexempt Committee members are Bill Fallon, George Tellmann, Jack Rutter, Brenda Lister, Gene McCarthy and Dave Ours.

The initial responsibility of both Committees is the evaluation of existing positions. The continuing responsibility of the Committees is to periodically reconvene and review new and changed positions.

The Evaluation Program being used by COMSAT was developed by Hay Associates and adapted specifically to the Corporation. A recent survey by the American Compensation Association disclosed that programs developed by Hay Associates are the most frequently used formal position evaluation programs in all of American industry.

The Committees, with guidance from a Hay consultant, review each position in the context of three major factors; Know How, Problem Solving and Accountability.

Each factor, which is considered separately, has a series of point values which increase in accordance with the depth and breadth of the

duties and responsibilities within a given position. The individual factor points are totaled, with a Total Point Value then assigned the position. These Total Point Values establish the ladder of positions in the Corporation.

Once the Total Point Values have been assigned, Hay Associates compare the dollar amounts COMSAT/COMSAT GENERAL pay for positions with specific Total Point Values with what other companies using the Hay process pay for positions at the same specific Total Point Values.

This comparison, at all point levels, will identify the Corporation's competitive pay position and assist management in developing fair and competitive salary administration practices.

This approach to job evaluation is seen by Management and by the Committee members who are working on the program as a progressive and valuable tool which should enable the Corporation to strengthen itself in an area of concern to all its employees.

**Thanks to you,
it works for all of us.
Give to your
UNITED WAY**

Red Cross certificates presented



National Red Cross certificates were presented to blood donors from COMSAT Labs, Raymond Kessler, seated, and left to right, John Falvey and Mel Grossman. Also present at the awards ceremony were Dr. B.I. Edelson, Director, COMSAT Labs, and Betty Mowen, of the COMSAT Labs Medical Unit. Donors not pictured are Don Rivera and Jay Levatich.

Son of Lab's Haynos subject of newspaper sports feature

Joe Haynos, son of deceased Labs employee Joseph G. Haynos, a former member of the COMSAT Laboratories Technical Staff, was the subject of a sports feature in a recent issue of the Washington Post.

According to Post writer John Schulian, "The Joe Haynos whom the students at Catholic University think of first is the human being, not the all-American club football player. . .

"He was not just No. 81, the defensive left tackle who was beating Catholic's North Carolina visitors brutally about the head and shoulders. He was the easily won friend, the

straight arrow who always speaks his piece, the guy everyone wants to sit next to in class."

Although young Haynos received many letters from "name" colleges when he finished high school there were no direct offers. His guidance counsellor suggested Catholic University, the school of his parents.

According to the six-foot, two-inch, 200-pounder, there are bonuses in attending Catholic U., the most heartfelt one of which he received last year following the Duquesne game. The next week the Cardinals presented the game ball to him, his mother, sister and six brothers.

Lawson awarded professional designation

Jim C. Lawson, Supervisor of Administrative Procedures at COMSAT Headquarters, has been awarded the professional designation of Certified Administrative Manager, C.A.M., by the Administrative Management Society.

With the professional designation, Lawson became the fifth C.A.M. in the Washington area since the program was launched by the Society in 1970. The Program was established to recognize qualified administrative managers and to award them professional status.

To be considered for the award, Lawson was required to pass a five-part written examination covering personnel management, financial management, administrative services, systems and information management and general management skills. In addition, each designated C.A.M. must have had management experience, proven leadership ability and have made a contribution toward more effective administrative management. An accreditation panel comprised of leading administrative managers and educators approves credentials prior to the award.

COMSAT boating club open house



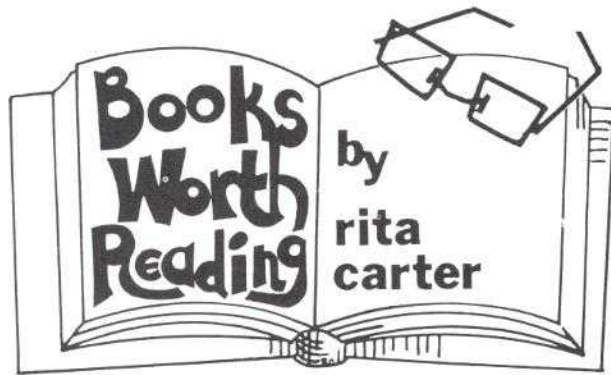
Past President Dan Swearingen, seated in dark shirt, welcomes guests of COMSAT's Ruth Hodgson to the Boating Club's Open House. With Swearingen, seated in circle from his left, are Treasurer Ernst Steinbrecher, VP Fred Meyer, and members Allan McCaskill, Martin Brown, Secretary Joyce Oseth and Tom Calvit.



With Martin Brown "in command" the Mobjack readies to cast off with Mrs. Ed Martin, daughter and company passengers. Mrs. Martin, who later joined the Club as a family member, was one of the many guests participating in the Open House.



The Daysailor with Chuck Dorian and his wife as passengers prepares to dock. Nick Steinbrecher handles the bow lines with Fred Meyer at the tiller. Both the Mobjack and the Daysailor were available for demonstration rides at the Washington Sailing Marina.



Scientific Analysis on the Pocket Calculator by JON M. SMITH; published by John Wiley & Sons.

Published in 1975, this is the first book that shows scientists and engineers what an amazingly powerful instrument the pocket calculator is. "Micronumerical methods" that will help the reader derive the most computing capability on his machine are discussed. *Scientific Analysis on the Pocket Calculator* is based on the as-

sumption that the pocket calculator provides its users with new dimensions in analysis. Numerous examples of techniques and methods show the analyst how the pocket calculator has become a research tool.

This book consists of four parts, each dealing with topics in numerical analysis that are useful to the practical analyst, along with a complete index to its terminology. In Part I, particular attention is given to unique

computing features available throughout the spectrum of pocket calculators. Mathematical preliminaries to analysis through complex variables in analysis are covered. The contents of Part II cover numerical methods and formulas for numerically evaluating advanced mathematical functions. Concepts such as parenthetical forms and recursion formulas are also discussed.

More advanced forms of performing analysis are included in Part III. Examples include numerical evaluation of definite integrals and methods for numerical differentiation of data sets, solving differential equations, simulating linear processes, and performing statistical analysis. Finally, Part IV illustrates analysis on the advanced programmable pocket calculator exclusively.

Scientific Analysis on the Pocket Calculator is ideal for all forms of analysis. It gives its users numerical techniques, approximations, tables, graphs, and flow charts for performing calculations. The book was written from eight years of study on numerical methods for analysis on the digital computer. Over the years, the author revised these methods to make them applicable to the pocket calculator. His publication emphasizes methods for such specific types of data processing as Fourier analysis, linear system simulation, gradient optimization, and statistical analysis. The forms are directly applicable to engineers, scientists and scientific programmers.

New Books

Reference

- Dun & Bradstreet Middle Market Directory*, 1976.
Dun & Bradstreet Reference Book of Corporate Management, 1975-1976.
Europa Yearbook, Volumes I, II, 1975. Europa Publications.
Hotel & Travel Index, Autumn, 1975. Ziff-Davis Pub. Co.
Notes on Distance Dialing, 1975. AT&T
Weisenberger Investment Companies, 1975. Weisenberger Services, Inc.

Proceedings

- C.C.I.R. (Geneva, 1974) XIIIth Plenary Assembly, Vol. I-XIII*. ITU.
National Aerospace Meeting, Alamogordo, New Mexico, May 12-13, 1975. Institute of Navigation.
Proceedings of the International Conference on Communications (ICC '74), Minnesota, June 17-19, 1974. IEEE.

Books

- BOFFERY, PHILIP. *The Brain Bank of America*.
 GRARD, R.J.L. *Photon and Particle Interactions with Surfaces in Space*.
 (Note: should be of interest to those concerned with satellite charging).
 JAKES, WILLIAM C. *Microwave Mobile Communications*.
 McDONALD, JOHN. *The Game of Business*.
 SMITH, JON M. *Scientific Analysis on the Pocket Calculator*.

Labs library expansion increases reader services



A view of the Labs Library before expansion.

Responding to six years of growth the Technical Library at the Laboratories has gone "double-decker" by adding a balcony, almost doubling its capacity to hold both books and readers.

"Before the expansion," said Librarian Rosa Liu, "much of the material which should have been out on the shelves was stored in closets. We just didn't have room for it all. The increased floor space now allows for easier access to the material by users as well as providing room for future growth, not to mention the improved working conditions for users of the library."

With the recognition some time ago by W.J. Fallon, Director, Labs Sciences, P.E. Ruddiman, Manager of Labs Office Services, and Librarian R. Liu, that the existing physical facility was bulging at the seams, approval was given by B.J. Edelson, Labs Director, for the expansion, and the actual renovation put in the hands of Clarence B. Crane, Facilities Manager.

According to "Pep" Ruddiman, "Facilities had to do a lot of designing in addition to the actual construction work. The structure had to be self-supporting since the library walls were not load bearing. Once the crew

went to work it was like watching the assembling of a giant erector set; slender, strong pillars were put in place, followed by a steel understructure, the flooring and lower level ceiling, railings and staircase."

With additional lighting installed and the necessary painting and polishing taken care of, the balcony structure was complete. Only the laying of the floor covering and the assembling of shelving remained for Facilities to finish the job.

"It took a full week to properly stack the shelves once the Facilities crew finished," recalled Ms. Liu, "and there were many sore hands, weary feet and aching backs. Taking future growth into consideration it had been decided to locate the journal collection, consisting of approximately 350 different titles, on the balcony level. Books and other reference material remain on the first floor."

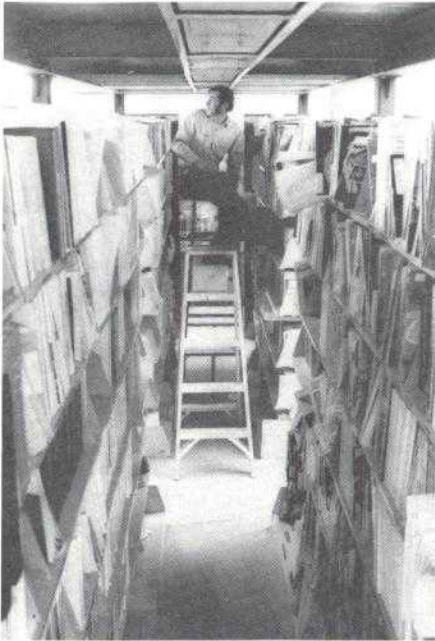
Although actual construction work extended over a period of several months, Library services were partially disrupted for only a portion of this period; even during this period the determined researcher could get



A. Fleming about to install the east ceiling section.

the service he needed.

Users of the expanded Library seem impressed with the ease of accessibility to material and the comfortable environment, according to the Librarian. The balcony, which serves as a sound damper to the high ceilinged room, also eliminated the need for the use of the time-honored, call-to-order command of the librarian, said Ms. Liu, "It's hardly even necessary to say 'Shhh' anymore."



Ceiling being wired by J.C. Carter.



Librarian Liu surveys completion of first phase of construction.



Completed upper deck has study carrels, a reading area, copy machine and five rows of double-stacked technical magazines and journals.

Rosa Liu and Kathleen Tarakai admiring completed balcony.



PHOTOS BY BILL MEGNA



Construction "Supervisors", left to right, Clarence Crane, Kathleen Tarakai, James Owens, Rosa Liu and Dan Fischer.

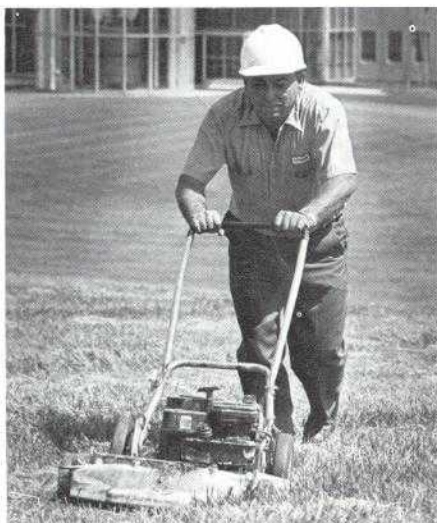
Labs Closeup

HOWARD L. HAINES, Groundskeeper

Visitors to COMSAT Laboratories at Clarksburg, Md. are always impressed with the beauty of the surroundings, the rolling grasslands, pond and woods. What an improvement over stone, glass and concrete of the big city industrial complexes! The one person responsible for the care and appearance of these attractive environs is Howard L. Hines, Groundskeeper.

Howard works in Facilities, managed by C. B. Crane, and is assisted by one regular employee and one temporary. Together they take care of 210 acres of COMSAT property, 35 acres of which are woodland, and 170 acres in grass (the buildings, roads and pond account for about five acres).

When he first came to COMSAT in 1969, Howard seeded all the grassland and has been tending it ever since, fertilizing and liming it, and cutting the grass regularly in the summer months. For this particular chore the company supplies two tractors of varying size with mower and loader attachments, one riding mower and two hand power mowers. Howard trains his assistants in the opera-



In Howard's work, machines have not yet replaced man.

BY SHIRLEY TAYLOR

tion of this equipment and then joins in the mowing operation. More difficult grading work he does himself. Then, on summer Saturday mornings the crew mows the island grass in the parking lots.

There's a lot more to keeping grounds than mowing grass, however. In addition to such maintenance there is pruning to be done, and spraying, mulching of shrubbery and small trees. The woods have to be thinned of dead wood regularly, and Howard and his men go in with chain saw in hand and leave quantities of wood available for employees to take home for their fireplaces. They keep the grounds clean and the weeds and poison ivy down to a minimum. All the while, they consult regularly with the University of Maryland Extension Service and U.S. Department of Agriculture.

Come winter, Howard watches weather and road conditions very carefully. A contractor comes in to do heavy snow removal, but Howard and his men take care of light accumulations. Sometimes he keeps the crew at the Labs all night to plow the snow before working hours begin. Howard is so diligent about watching winter weather that last winter he sent his wife and daughter on the COMSAT CEA-sponsored Hawaii trip, but didn't dare leave long enough to go himself!

It's also in wintertime that Howard makes sure that the bird-feeders are kept full of seed and the geese and ducks on the pond are regularly fed corn. He keeps an eye out for the wildlife and some not-so-wildlife—several months ago, he caught some strangers siphoning gasoline from cars in the parking lot after he had been tipped off by a cafeteria employee.

A unique feature of Howard's job is the COMSAT employees' gardens.



Labs Groundskeeper Howard Haines.

About five acres are provided for this purpose, and every spring Howard arranges with the farmer nearby to plow the land. Then he goes in and discs and harrows the ground in preparation for planting. After harvest he goes back and discs and harrows it again and prepares it for winter. More than one new gardener has benefited from his instruction in the use of a rototiller, and what to spray to kill off the cabbage bugs.

One of six children, Howard was formerly self-employed as a farmer and still farms for self-sufficiency, living across the road from the house in which he was born. He keeps a few cattle, pigs and chickens, and tends a small garden plot. Married to the former Freda Kelly for 26 years, he has two sons and two daughters, two still at home, and four grandchildren. So-called leisure hours are spent taking care of his farm, a little fishing and hunting, and some traveling with his wife. The two are active in the local Methodist Church.

Howard is very happy at COMSAT, and he enjoys the people he works with. He has no desire for change and no plans for retirement. His co-workers are glad to hear that, because who would set up the picnic tables, keep up the softball field, haul in the supplies, watch out for the ducks and geese, and give advice on the gardens but Howard?

Mrs. Taylor is in the Senior Scientist's Office at the Labs.

Network Bits

Field Correspondents

Andover

Joanne Witas

Cayey

John Gonzalez

COMSAT General (Plaza)

Jean Baldwin

Etam

Bev Conner

Jamesburg

Warren Neu

Labs

Carol Van Der Weele

New York

Stephen Keller

Paumalu

Bob Kumasaka

Plaza

Gloria Lipfert

Santa Paula

Pat Hogan

Southbury

Eileen Jacobsen

10-speed bike as its grand prize.

We're still getting used to our Administration Office's face-lifting, the paint job on the walls was changed from "wedgewood blue" to "flame orange." —**Joanne Witas**



Judy Hodgkins, left, and Barbara Richardson of the Andover Earth Station look at satellite communications display in the Visitors Center. Exhibited items were provided by COMSAT Labs and include microwave integrated circuits, satellite batteries and solar cell panels.

CAYEY. Frank J. Falmar, one of our original Operations Supervisors, has resigned to go into a business of his own. He has a plant nursery called *Exotique of Puerto Rico*. Senior Technician **Elfren V. Castro** has been promoted to Operations Supervisor.

Facilities Supervisor **Paul J. McGranahan** recently underwent a few "trying" experiences. First, he took a crash course in conversational Spanish and he's still "trying." Actually, he's progressed to the point of "Spanglish." His second experience is of a serious nature. He is suffering from a pinched nerve on his upper back causing a numbness in his left arm. He is undergoing therapy at the Veterans Administration Hospital.



New supervisors **Elfren Castro**, left, and **Otto Irizarry** pose for pictures . . .

ANDOVER. The station has been busy with contractors, new installations and the handling of routine traffic. The ITT transmitters have been received from Paumalu. **John Hewitt** from the Plaza and Brewster's **Mel Hoffman** have removed the high powered amplifiers (HPA) from Andover 1 (radome) and put them in Andover 3. The ITT transmitters have been installed in Andover 1.

Heat exchangers have been installed for Andover 3 with the majority of the plumbing work performed by Master Electrician **Bill Nuppula**, assisted by facilities' personnel.

COMSAT Wives of Andover have been busy preparing their booth for the 38th annual hospital fair under the co-chairmanship of Mrs. **Charles Lepage** and Mrs. **Donald Fifield**. The COMSAT booth will give away a



Ken Dixon adds finishing touches to Andover's Visitors Center, recently updated with the assistance of the Public Information Office.



before settling down to a celebration luncheon with fellow staffers featuring "Lasagna-a-la-Puerto Rican."

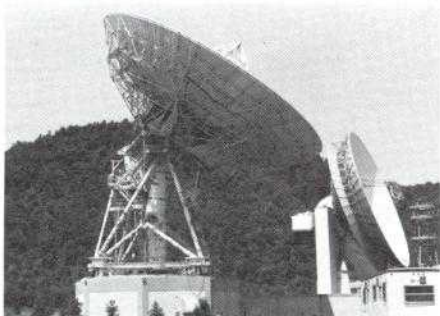
Luis Medina-Santos, our Material Control Specialist, has bought a new home in Cayey so large and attractive that we now refer to him as "El Exigente." —**John J. Gonzalez**

COMSAT GENERAL (Plaza). **Viviane Trainor**, secretary to **Robert Briskman**, returned recently from a very historic tour of Italy with the Diocese of Arlington. On her visit, Viviane witnessed the canonization ceremonies of Saint Mother Elizabeth Seton at the Vatican in Rome. She also toured the cities of Florence, Naples, Sorrento and Pompeii. In Florence she took a side trip to the town of Pisa where she met her Italian cousins for the first time. From Pisa, she retraced some of her family history and visited the village of Bagni San Giuliano, the birthplace of her grandfather.

—**Jean Baldwin**

ETAM. Antenna Number Two is in its final stages of construction. Although there were some problems along the way, November 1 has been set as its operational date if no other delays develop. The new antenna is of the wheel and track type while the main reflector of the antenna is made of anodized aluminum, requiring no painting, which gives a striking appearance as one drives up the valley to the station.

Our station manager for the past eight years, **Bill Carroll**, has been transferred to Headquarters. Several of the staff got together for a lunch-



Etam's antenna number two.

eon for the Carrolls at the Howard Hotel in Rowlesburg prior to their departure. A pair of handsome golf shoes were presented to Bill and coal jewelry to his wife on behalf of all Etam employees.

New Station Manager **William L. Miller** and his wife have arrived and are in the process of building a new home in Kingwood.

The Facilities Department has undergone staff changes. **Ronald Feather** joined the staff as Facilities Me-



Wednesday afternoon cook-out.

chanic. **Ron** resides in Oakland, Maryland, with his wife **Marion** (twin sister of fellow Facilities Mechanic **Marvin Miller**) and young daughter **Lisa**. **Bill Adams** has rejoined the Department as Facilities Mechanic giving up his full-time farming venture. Temporary employees **Russell Goines** and **Phyllis Loughrie** terminated their employment. An informal get-together was held in the canteen prior to their departure with refreshments served. **Clifford Sigley**, Advance Industrial Security Janitor, returned to work after a few months off to tend to some chores on his farm.

Don Gaston, Operations Supervisor, was admitted to the Broaddus Hospital in Philippi, West Virginia, in September where he underwent surgery. He is now recuperating satisfactorily at home.

A luncheon was held for all CEA members recently. The menu consisted of Long John Silver's fish, cole slaw, cucumbers and other delicacies. With the turnover of personnel at the station, a spaghetti dinner was held to get acquainted at the Preston



The last mushroom hunt.

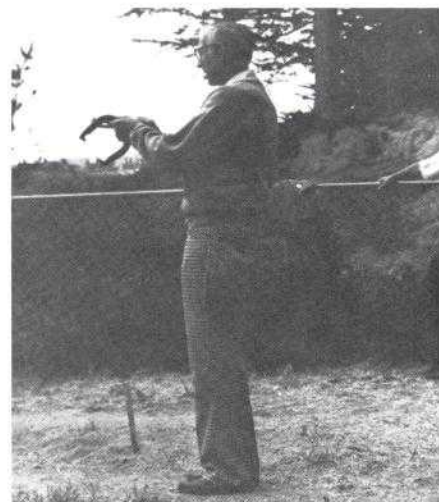
Country Club with most staffers present. **Daryl Riddle**, who is en route to the new TT&C Station he will manage in Camaroon, and his wife **Dottie** attended.

Station Manager **Miller** caught our chef **Chet Randolph** (barely visible at rear) charcoaling hamburgers for our Wednesday afternoon hamburger feast (photo at left).

Senior Technician **Vic Molek** found more than he was looking for while picking mushrooms—a rattlesnake. According to Vic there were three but two managed to get away. One stayed to strike but Vic grabbed a stick and killed it (it had 10 rattles). A direct quote from Vic: "This kid is going to buy his mushrooms from now on."

—**Bev Conner**

JAMESBURG. The COMSAT Employees Association picnic was held on a day on which we experienced unusual weather for California for this time of the year, it was overcast and chilly. However, the facilities and environment of the Naval Post Graduate School Golf Course, where we held the picnic, more than made up for the unexpected weather. There were more than enough refreshments and **Larry Cisneros** and **Roy Scheiter** did an outstanding job of organizing games for all age brackets. Their selection of prizes and winners was met with no argument and was appreciated by the winners. Unfortunately, none of the golfers brought their sticks and we were left without golf yarns or scores.



Station Manager John Scroggs at the horseshoe pit.



Stan Nubin and Cambrel Marshall came prepared and cared less about the weather.



Summer in California? Sure it's not Fall?

As of August our new JCEA officers are **Jack Inman**, President; **Gay Powers**, Vice President/Social & Athletic; **John Pate**, Secretary; and **Cambrel Marshall**, Treasurer. The new slate has great plans for the new year.

—Warren E. Neu

LABS. Sorry to report I missed a very special visitor to the Labs while on vacation, **Charles Sterling Martin**, infant son of **Ernie and Judy Martin**. The Martins, former COMSAT GENERAL and Labs employees, were returning to Holland but had to stop by and visit their former friends and workers and to introduce son Charles.

Since there have been so many good happenings to the people at Clarksburg one big "Congratulations" will have to do: to **Steve** (son of Labs' **Shirley Taylor**) and **Carolyn Miller** on their recent marriage; to the **Bill Hixons** on the September 30 birth of their second son **Rob-**

ert William at Holy Cross Hospital, who weighed in at eight pounds, 11 ounces; to *all* our new expectant mothers; and to **Bud and Erma Kennedy** on their lovely new home.

Lots of vacation reports since last issue: **Pete Carlton**, wife **Arlene** and children **Eric** and **Sherry** spent a few days in Ontario, Canada—Pete delayed his departure to play in the softball team's second tournament of the year; **Holly Pryatel** and roommate **Barbara Lunsford** spent two weeks in Florida; the **Helms**—**Neil, Judy** and **Karl**—along with friends, spent a week relaxing at Middlesex Beach, a favorite vacation spot of the Helms; **Barbara** and **Hugh Hutchens** had planned to spend a week in the sun at Myrtle Beach, South Carolina, but understand they had sunshine only about half of the time.

The **Van Der Weeles** (your columnist, husband **Bill** and son **Chris**) spent a week visiting relatives in Indiana, highlighted by a visit to the Golden Dome on the campus of the Fighting Irish of Notre Dame and a day at the Firestone Country Club

in Akron (Canton), Ohio; **Pam Wood** and daughter **Casey** just returned from three weeks touring England accompanied by Pam's sister-in-law.

It's good to have **Norman "Grandpa" Miller** back at work after an absence of three months. Norman had a motorcycle accident early in the summer and was immobilized with a smashed foot.

The COMSAT Basketball Team has begun practice for the 1976 season and looks like it should be better than ever. With continued teamwork, cooperation and effort we can capture the City of Gaithersburg title again. The Second 1975 Invitational Softball Tournament was held recently on the Labs' softball field and it was a success. The weather was nice, the teams were good, and COMSAT placed second after two games in a row to determine the winner. **Wayne Brown** was designated Most Valuable Player of the tournament. The weather was good, the teams were good, the only thing missing—the fans. Sure would like to see more supporters out for the games. —Carol Van Der Weele

Five-year awards



Receiving five-year awards from Labs Director **B. I. Edelson** and Director of Personnel **David S. Nye** are: seated, **Elsie McGrady** and **James Francis**; standing, left to right, **John Hannsen**, **Nurse Betty Mowen**, **Nye**, **Edelson** and **Wilmer Phillips**.

NEW YORK. COMSAT GENERAL'S New York office is the focus of the MARISAT marketing effort in the United States. Since this is our initial contribution to *PATHWAYS* perhaps a few words about our location would serve as an appropriate introduction for our column.

The Port of New York is the largest in the Western Hemisphere and the leading port of the world for the high-speed handling of containerized cargo. In addition to being a major seaport, New York is a center of management for the shipping industry of the world. The tankers, cargo and passenger ships of the companies located here carry the world's trade under the flags of a multitude of nations. The headquarters of the three major oil companies—Exxon, Texaco and Mobil—controlling over 400 tankers, are within 10 blocks of our office.

The companies in our immediate neighborhood are primarily tanker owners and operators, while most of the cargo companies are located downtown in the vicinity of the World Trade Center. We frequently take the Metroliner to Philadelphia to visit oil companies and shipowners based in that area, and have also visited companies in Houston, New Orleans, Los Angeles and San Francisco.

Rockefeller Center represents New York to many visitors. Our office in the International Building overlooks the statue of Prometheus at the skating rink. The St. Patrick's Day Parade is a New York tradition and we have an excellent view of this event. The three broadcasting networks and several publishing companies have their headquarters in Rockefeller Center.

New York has always been one of the centers of international trade and virtually all nations maintain consulates and commercial attaches in our area. These offices are frequently combined with national missions to the United Nations and provide a wealth of business information about their countries. —**Stephen Keller**

PAUMALU. Just another sprout on the Paumalu antenna farm? It may look that way, but this 15-foot-diameter antenna, dwarfed by the

Paumalu 1 dish, is destined to be "transplanted" to other earth station sites in the near future. It was installed and operated at Paumalu by **Dan Difonzo, Bill English, Warren Trachtman** and **Ken Pease**, from COMSAT Laboratories, as part of an experimental program to develop new techniques for measuring the polarization properties of earth station antennas using INTELSAT satellite signals.



Paumalu 1 antenna dwarfs Labs-designed 15-footer.

The 15-foot antenna, designed at the Laboratories, is an accurately calibrated polarization reference standard using feed and polarizer components. The quality of the 97-foot antenna is deduced by comparing the signals received and transmitted respectively from the 15-foot and 97-foot antennas. The importance of these measurements lies in the fact that starting with INTELSAT V, satellites will reuse the available frequency bands by carrying communications traffic on two orthogonal polarizations at the same frequencies. Any degradation in antenna quality which would cause conversion from one polarization to the other results in an increase in interference and reduced channel capacity.

Team Leader **Difonzo** stated that the results obtained from the experimental program demonstrated the feasibility of using satellite signals for



COMSAT crew assembles portable antenna for measuring polarization properties at Paumalu.

polarization measurements. He praised the Paumalu station personnel for providing excellent cooperation to the test team throughout the three-week-period.—**Bob Kumasaka.**

PLAZA. **Teresa Halsill** has joined U.S. Systems Operations as an Electrical Engineer. She is a graduate of the Speed Scientific School of the University of Louisville with a B.S. in Electrical Engineering. **Joyce Oseth** of U.S. Systems Management married Paul Wheeler in October. **Lynne** and **Wally Wells** have a new son **Adam Gregory**, born August 25.

The COMSAT Women's Softball Team, the Satellites, for the first time in its five-year history, made it to the D.C. city-wide playoffs. After winning their first game in the playoffs they were knocked out of the competition by the Torques. There was some consolation for the Satellites, they were eliminated by the best—the Torques took the City Championship.

All was not sorrow for the team members, however, since there were many exciting moments to recall: the close call with victory, the thrill of the homerun and the sharing of good times at the "tune-in" or "Retreat" following the game. And there was the rousing party at the Thompson Boat House where other talents were displayed, "The Bump" and "The Hustle," and vocal chords were stretched to music late into the night.

COMSAT players this season were **Ruth Adams, Linda Kortbawi, Hil-**

lis LaRose, Katherine Pyles, Gail Ricci, Evelyn Smith, Beatrice Wilborn and our team captain, and terrific pitcher/catcher, Mabel Vandergriff. Other players from outside COMSAT making up the Satellites were Laurel Bryan, Karen Heygi, Carolyn Jones, Claudia Toy, Nancy Stevenson and our fantastic speedball pitcher, Peggy Snoots. Coaching the team were COMSAT's Harriet Biddle and Wayne Brown, assisted by Ralph Lorenzo, Bill McGraph and Bill Diwoody of GSI. Team Manager Marion Timmons was assisted by Joyce Przelenski.

Margo Logan, Forms and Procedures Assistant in the Administrative Procedures Section, has been awarded a certificate in Forms after successfully completing studies in systems analysis and forms design. Kathleen Emanuel and Leo Loevner have been promoted to the positions of Payroll Supervisor and Revenue and Consortia Accounting Supervisor, respectively. —Gloria Lipfert

SANTA PAULA. Everyone has been busy with the final station testing and preparation for the INTELSAT IV-A launch. Nearly normal operation is a welcome change after the long construction period.

Most of the station staff are transferees from COMSAT earth stations and feel at home with an operating station. Dan Geer, Jeff Gnass and Frank Meyer were previously at the Paumalu, Hawaii, station. Gordon Johnson came from the Spacecraft Technical Control Center in Washington, D.C., Charles Kraft and Dennis Hill from the Jamesburg, California, earth station and Jim Peasley from Brewster. Karl Jessinghaus was previously at the NASA Deep-space Station at Goldstone. Your columnist is the only member of the staff with no previous satellite related experience.

Bicycling became an increasingly popular hobby over the past few months. Six employees were riding regularly to work at last count. Jeff

Gnass entered a Ventura County Century (100 mile) ride on 21 September and completed it in 5 hours 17 minutes, a record expected to stand for awhile. —Pat Hogan

SOUTHBURY. To our Station Manager, Dave Durand, congratulations on his tenth service anniversary with the Corporation. "Bart" Barlett, our station engineer, has resumed training in a Cessna 150 at the Oxford Airport aiming toward acquiring his private pilot's license. Bart and Dave Kellie, Senior Electronics Technician, attended a Hewlett-Packard Digital Seminar in Hamden recently.

Jim Nelson, Jr., son of our Facilities Engineer, is attending Tunxis Community College in Farmington as a Graphics Art major. Your reporter recently completed a half-day training course in New Haven on the Western Union Telex machine. Incidentally, our Telex Number is 962-408. —Eileen Jacobsen

At Presstime

COMSAT reports third quarter results; regular quarterly dividend declared

COMSAT has reported consolidated net income of \$11,837,000 for the third quarter of 1975, equal to \$1.18 per share, as compared to \$11,588,000 or \$1.16 per share for the third quarter of 1974.

A quarterly dividend of 25 cents per share, payable on December 8, to all shareholders of record as of the close of business on November 7, 1975, was declared by the COMSAT Board of Directors at its monthly meeting in October. It is COMSAT's twenty-first consecutive quarterly dividend and the sixth at the 25-cent rate.

New operating income for the third quarter was \$10,119,000 or \$1.01 per share, as compared to \$9,428,000 or 94 cents per share for the third quarter of last year.

Operating revenues for the third quarter increased to \$35,116,000 from \$34,220,000 for the third quarter of last year despite a reduction of \$2,010,000 in revenue from the U.S. mainland-Hawaii service. Effective June 1, 1975, the rate for such ser-

vice was reduced to \$300,000 per month from \$970,000 per month. Lease of full time half circuits to the Corporation's carrier customers for service to other points continued to grow. At September 30, 1975, the number of such leased circuits was 3,547, as compared to 3,413 at June 30, 1975, and 3,123 at September 30, 1974.

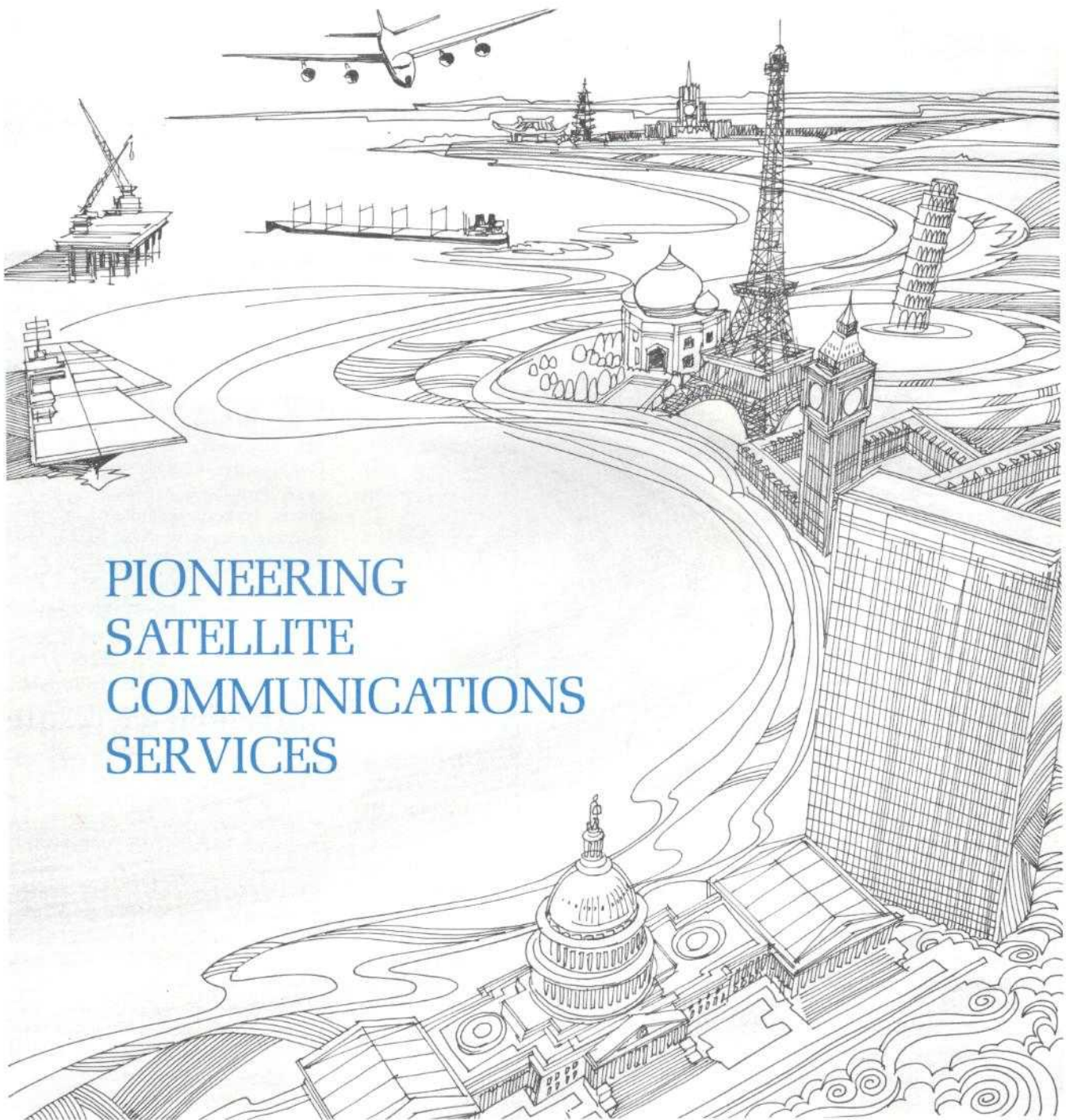
Operating expenses, including income taxes, were \$24,997,000 for the third quarter, as compared to \$24,792,000 for the third quarter of last year.

Other income, after provision for income taxes, amounted to \$1,718,000 for the third quarter, as compared to \$2,160,000 for the third quarter of 1974. The reduction resulted from the investment in new satellite programs of funds previously held in temporary cash investments as well as lower interest yields on invested funds.

For the first nine months of 1975, consolidated net income amounted to \$36,157,000 or \$3.62 per share, as

compared to \$32,601,000 or \$3.26 per share for the first nine months of 1974. Net operating income was \$30,747,000 or \$3.07 per share, as compared to \$26,379,000 or \$2.64 per share for the first nine months of last year. Operating revenues amounted to \$106,181,000, as compared to \$97,542,000 for the first nine months of last year. Operating expenses, including income taxes were \$75,434,000 as compared to \$71,163,000 for the first nine months of last year. Other income, after provision for income taxes, amounted to \$5,410,000 for the first nine months of 1975, as compared to \$6,222,000 for the first nine months of 1974.

All reported results are subject to the effects, if any, of the outcome of the Federal Communications Commission investigation of COMSAT's rates for services provided through the global communications satellite system. The Commission has not yet reached a determination in this proceeding.



PIONEERING SATELLITE COMMUNICATIONS SERVICES

Through its pioneering of the global communications satellite system, COMSAT has helped bring nations of the world as close together as next door neighbors.

In addition, COMSAT General Corporation is engaged in pro-

grams to provide maritime, U.S. domestic and aeronautical satellite communications services.

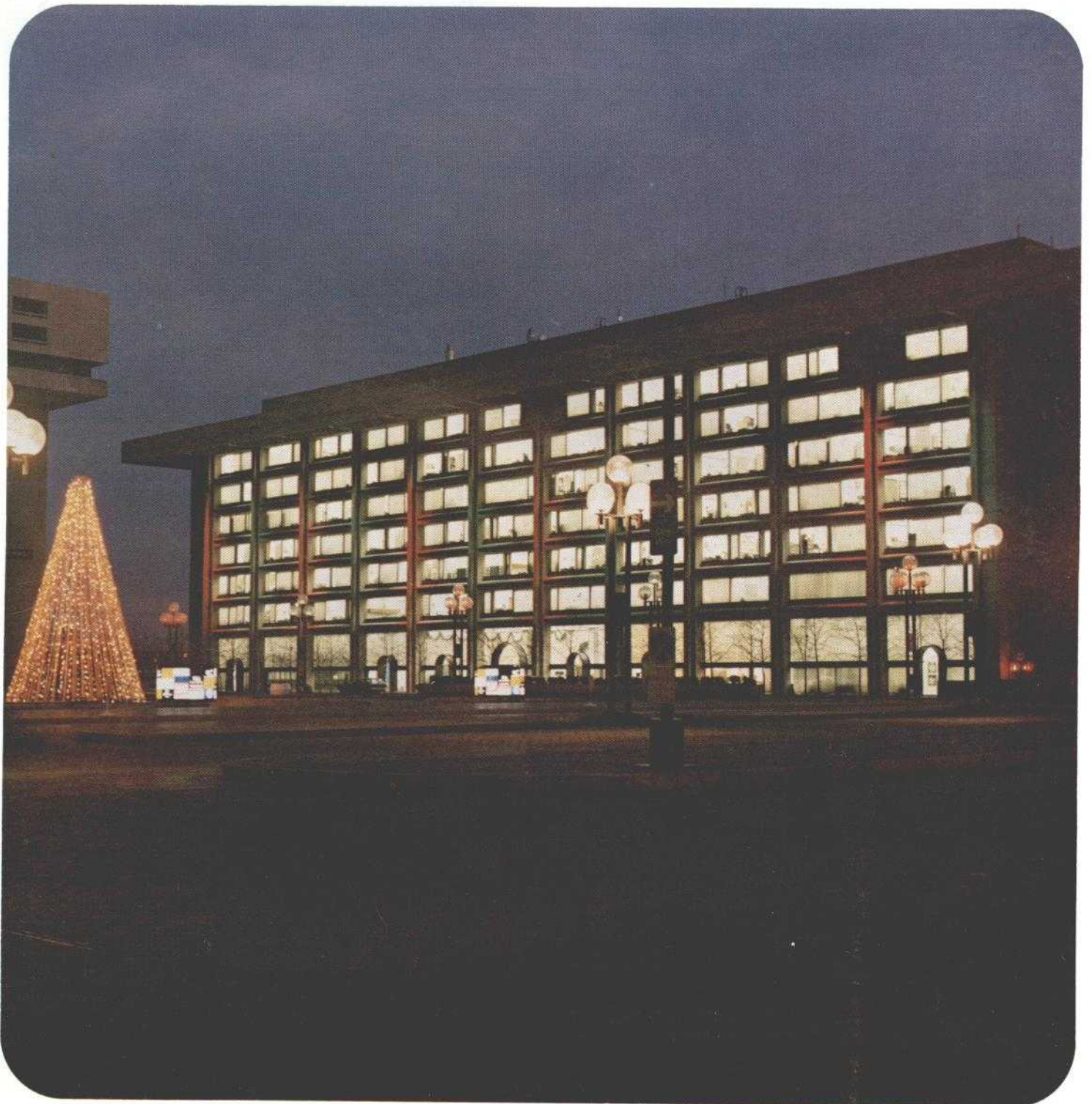
Soon people will be able to stay in constant touch wherever they are . . . via satellite.

COMSAT

COMMUNICATIONS SATELLITE CORPORATION
COMSAT GENERAL CORPORATION
WASHINGTON, D.C.

November/December 1975
Volume 1 Number 2

Pathways SATELLITE



Pathways^{SATELLITE}

November-December 1975
Volume I Number 2

PATHWAYS is published every other month by the Public Information Office, Communications Satellite Corporation, COMSAT Building, 950 L'Enfant Plaza, S.W., Washington, D.C. 20024. Phone AC 202, 554-6104 or 6105.

EDITOR

John J. Peterson

PHOTOGRAPHY

Allan W. Galfund
James T. McKenna

STAFF CONTRIBUTORS

Allan W. Galfund
Larry G. Hastings
James H. Kilcoyne
James T. McKenna
Edgar Bolen, Production

PUBLICATION ADVISORS

COMSAT

Joseph V. Charyk
President
Lucius D. Battle
Senior Vice President
Corporate Affairs
Robert B. Schwartz
Secretary and Director
of Public Information
Stephen D. Smoke
Manager, Publications
Lawrence Weekley
Manager, Media Relations
and Information Services

COMSAT General

Fred W. Morris
Vice President
Corporate Development
Hale Montgomery
Director of Public Affairs

A member of the International Association
of Business Communicators.

Cover

The Headquarters of COMSAT and COMSAT General at L'Enfant Plaza in Washington, D.C.

photo by Allan W. Galfund

Contents

	Page
A Holiday Message from the Chairman of the Board and the President	1
The Busy Signal: a victim of satellite communications. A feature by Stephen D. Smoke	2
Lost Civilization on Downlink of Global System Earth Station. A feature by Dr. Pier L. Bargellini as told to John J. Peterson	5
Measurement Team Completes INTELSAT IV-A In-Orbit Acceptance Tests. A feature by Irving Dostis and Martin Brown	10
News of the Corporation	11
Books Worth Reading. By Rita Carter	16
Notes from Personnel	17
Network Bits	18
A CEA activity montage by Mary Pate	20
At Presstime	21

to members of the
communications satellite
corporation family
and their families:

we are pleased to take
this opportunity to
extend season's greetings
and best wishes for
a joyous new year.

James V. Dwyer

The busy signal: a victim of satellite communications

BY STEPHEN D. SMOKE

COMSAT provides satellite services to the U.S. international communications carriers serving the public. It provides these services through the satellites of the International Telecommunications Satellite Organization, INTELSAT, in which it has an ownership interest of 33.6 percent, and through U.S. earth stations in which it has an ownership interest of 50 percent. The INTELSAT satellites and the earth stations in some 70 countries operating with them are known as the global system.

The circuits aren't busy anymore.

You can now reach your party in more than a hundred countries, territories or possessions almost as quickly as if you were calling a friend across town.

You can also see history-making world events, as they happen, on television right in your own living room.

All of this has been made possible within a very few years by the communications satellite.

In preparing this article, I wanted to touch base with my friend Leo Lomanto who was with the Brazilian Ministry of Education the last time I talked to him. I merely asked the operator to get me Leo in Brasilia at 236309. She found that his number had been changed to 232648. Within a matter of seconds, Leo was on the line, letting me know that he was now a Congressman from the state of Bahia.

*Mr. Smoke is COMSAT'S Manager,
Publications.*

The way it was

"Less than 10 years ago I sat around the Gloria Hotel in Rio de Janeiro for two days trying to reach my editor in New York."

Less than ten years ago, before Brazil had a satellite earth station, I sat around the Gloria Hotel in Rio de Janeiro for the better part of two days trying to get my editor in New York City. We kept missing each other because of long delays in getting a circuit. I had the same experience in six other Latin American countries. Later I spent a week trying to reach an associate in Thailand. Then the high frequency radio connection to Bangkok was so bad he had to send me a telegram to verify what he had told me. There were, of course, good cable connections between the United States and Europe, but I still experienced substantial delays, although of much shorter duration, in trying to reach New York from Munich, Paris and London.

None of these experiences was surprising in those days. There just weren't many high-quality overseas circuits in existence, nor was commercial TV transmission possible across oceans until development of the global satellite system was undertaken with the launching of the Early Bird satellite in 1965. As recently as 15 years ago, for example, there were only 468 international telephone message circuits from the U.S. to other countries; 243 of them were of the unreliable high frequency radio and troposcatter vintage; 225 were high quality transocean cable circuits.

The way it is today

The world has been pulled together by communications pathways which have brought nations as close together as proverbial next-door neighbors.

In the short time that has passed the world has virtually been pulled together by communications pathways which have brought nations as close together as proverbial next-door neighbors. By the end of 1974, there were about 5,597 high quality international message circuits from the U.S. to other countries; about 2,922 of them were satellite circuits and 2,510 were transocean cable circuits. Only 165 were high frequency radio or troposcatter circuits.

This remarkable growth in man's ability to communicate with his fellow man has been made possible through significant advances in both satellite and cable technology. Today cables link the U.S. mainland with England, France, Spain, the Caribbean, Hawaii, Japan and Australia. The capacity of cables has been increased from about 35 circuits in the first transatlantic cable in 1956 to 4,000 circuits in the sixth transatlantic cable planned for service in 1976.

The growth in satellite capacity has been even more dramatic. While Early Bird, the world's first commercial communications satellite, had a capacity of 240 simultaneous telephone calls or one TV channel, the INTELSAT IV-A satellites currently being launched, have a capacity of 6,250 telephone circuits plus two TV channels. The next generation of INTELSAT satellites will have a capacity of 12,250 tele-

phone circuits plus two TV channels.

Cables, however, do not carry television and they represent a point-to-point service. Satellites on the other hand, stationed 22,300 miles above the equator, provide a multipoint communications capability. A single satellite stationed over the Atlantic Ocean, for example, gives the U.S. direct connection with 42 countries in that region and the Pacific Ocean satellite gives the U.S. direct links to 18 more countries in that region. The Indian Ocean satellite links 31 countries.

Worldwide, the global system of satellites operating over the Atlantic, Pacific and Indian Oceans provides 384 direct satellite pathways among 64 countries with earth stations; it offers 530 direct user-to-user connections through a combination of satellite and terrestrial links. Through this system, more than a billion people on six continents can now see an event of sufficient international importance on TV, as it takes place, "Live via satellite."

Economic benefits

Before satellites it cost \$12 for a three-minute, station-to-station telephone call between New York and London. The same call made today at night costs \$4.05.

Figures such as these are, indeed, impressive. However, they have far more than statistical meaning. Before the advent of satellites, the charge for a three-minute station-to-station telephone call between New York and London was \$12; today that same call can be made for \$5.40, a reduction of 55 percent. If you call between 5:00 p.m. and 5:00 a.m., the charge is only \$4.05.

Those who lease circuits on a full-time basis have experienced the same significant economies. Prior to 1966, the charge for a leased telephone circuit between the United States and Europe was \$20,000 a month; today the charge is less than \$10,000 a

A few comparisons of telephone service between the U.S. and selected countries before and after the introduction of satellite communications.

Country	Earth Station completed	Minutes of telephone conversation	
		Year before satellite service	Year 1973
Brazil	Feb. 1969	400,000	4,700,000
Indonesia	Sept. 1969	6,000	291,000
Jordan	Dec. 1971	4,000	71,000
Senegal	Nov. 1972	13,000	30,000

month, a reduction of over 50 percent.

It is difficult to determine whether economical communications contribute to economic development or whether communications merely follow or mirror such progress. In the final analysis, communications growth probably contributes to and results from economic growth. The impact that satellites have had on the international communications of emerging countries is, however, reflected in the sharp increases that have occurred in the number of minutes of telephone conversation between various countries and the United States following the establishment of satellite earth stations in those countries. (See box above.)

Domestic systems

More and more countries are turning to the satellites for communications within their own borders.

More countries are also turning to the use of satellites of the global system to improve their own domestic systems. Among these are: Brazil for improved communications between Rio de Janeiro and the interior cities of Cuiaba, Manaus and Boa Vista with others to come; Algeria for connecting Bechar, Lakhdaria and Ouar-

glia with 11 others to follow by early 1976; and Norway for connecting Frigg, Lund, Ekofisk and Statfjord. Malaysia, Nigeria, Zaire and the Philippines are still other countries using or planning to use global system satellites for domestic communications.

Indonesia is undertaking development of an extensive domestic satellite system of its own, similar to those already operating in the Soviet Union and Canada and those under development in the United States.

Impact of television

In 1965, there were about five or six satellite transmissions a month amounting to some six hours. Today the system averages between four and five hundred transmissions a month, well over 200 hours of telecasts.

Although television accounts for less than two percent of the total use of the global system, it has had a profound impact throughout the world.

Daniel D. Karasik, COMSAT's Manager, Customer Relations, puts it this way: "Back in the late 1940's when I was 'teething' on the foreign desk of the Chicago Daily News, our managing editor, Ev Norlander, had a

large banner headline under the glass top of his desk. It read, 'If it isn't local, it isn't real.'

"To a great extent, that's still true. Yet, on the 11:00 p.m. news tonight in New York City, scenes of the fighting in Beirut will share the screen with film on the city's financial crisis.

"I'm not suggesting that satellite television has transformed the good people of the Bronx or Manhattan into citizens of the world, but it has enlarged their frame of reference; it has expanded the news base to which they feel some relationship; it has altered their feeling about what has local relevance.

"In the relatively short span of one decade," Karasik continues, "rapid advances in satellite television have encouraged tremendous increases in the frequency and the amount of material transmitted by the global system. In 1965, there were about five or six transmissions a month, amounting to some six hours. Today the system averages between 400 and 500 transmissions a month, well over 200 hours of telecasts."

Karasik notes that "despite the fact that the quality of the satellite television signal is about twice as good today as it was in 1965, costs have been drastically reduced. For example, a broadcaster now pays about \$5,100 for satellite transmission of a one-hour program from Paris to New York, as compared with \$22,350 when satellite services were initiated. COMSAT's share of that \$5,100—for the first hour of service between a U.S.

earth station and an Atlantic Ocean satellite—is only \$1,500.

Satellite television has fostered the growth of a new kind of international diplomacy. Japanese broadcasters transmitted over 66 hours back to Japan during the visit of Emperor Hirohito to the United States.

"The ability of satellite television to eradicate distance and bring an event from anywhere in the world to a viewer in real time has had a considerable impact on the economics of sports. The potential audience has been expanded tremendously to include most of the world's population. This has greatly enhanced the value of the rights to broadcast or display closed-circuit television of an event. Thus, we find that ABC has paid some \$25 million for the American rights to telecast the 1976 Olympics, about \$12 million more than it paid for the 1972 games.

"Because a big satellite happening bathes the locale of the event in a global limelight," Karasik also notes, "there are those who are willing to spend considerable sums to have that limelight focused on their country. Zaire reportedly spent about \$12 million to bring the Muhammad Ali-George Foreman fight to Kinshasa. Promotion money in Malaysia drew

the Ali-Bugner bout to Kuala Lumpur, and undisclosed sums attracted the Ali-Frazier match to Manila."

Karasik also points out that "satellite television has fostered the growth of a new kind of international diplomacy which probably reached its zenith when the Emperor of Japan visited the United States. Japanese broadcasters transmitted over 66 hours of satellite television material back to Japan during the Emperor's tour. Although the travel of heads of state had been chronicled by television before, it was the visit of former President Richard Nixon to Peking that set the standard for this type of activity. Since that trip, national leaders and their families have traveled the world at an accelerating pace, assured that the folks back home will be watching while great nations and great men bestow honors upon them."

Perhaps the greatest impact of "via satellite" television was manifested in the United States during the war in Vietnam. The day-to-day war coverage via satellite was probably the single most important factor in polarizing American opinion about the war, for as well as against. In a sense, the satellite turned the events of the war into "local" stories in which Americans became emotionally involved.

In summing up, Karasik says, "It still may not be real, if it's not local, but the satellite has pulled a lot of things much closer together, and we and the world will never be the same again."

BY
DR. PIER L. BARGELLINI
AS TOLD TO
JOHN J. PETERSON

Lost civilization on downlink of global system earth station

Editor's note. Pathways presents this feature on Peru in its continuing effort to provide its readers with a broader understanding of the countries in which earth stations of the global system are located.

Drs. Pier L. Bargellini and Geoffrey Hyde of COMSAT Laboratories presented papers recently at the Eighteenth General Assembly of the International Union of Radio Science, URSI, in Lima, Peru.

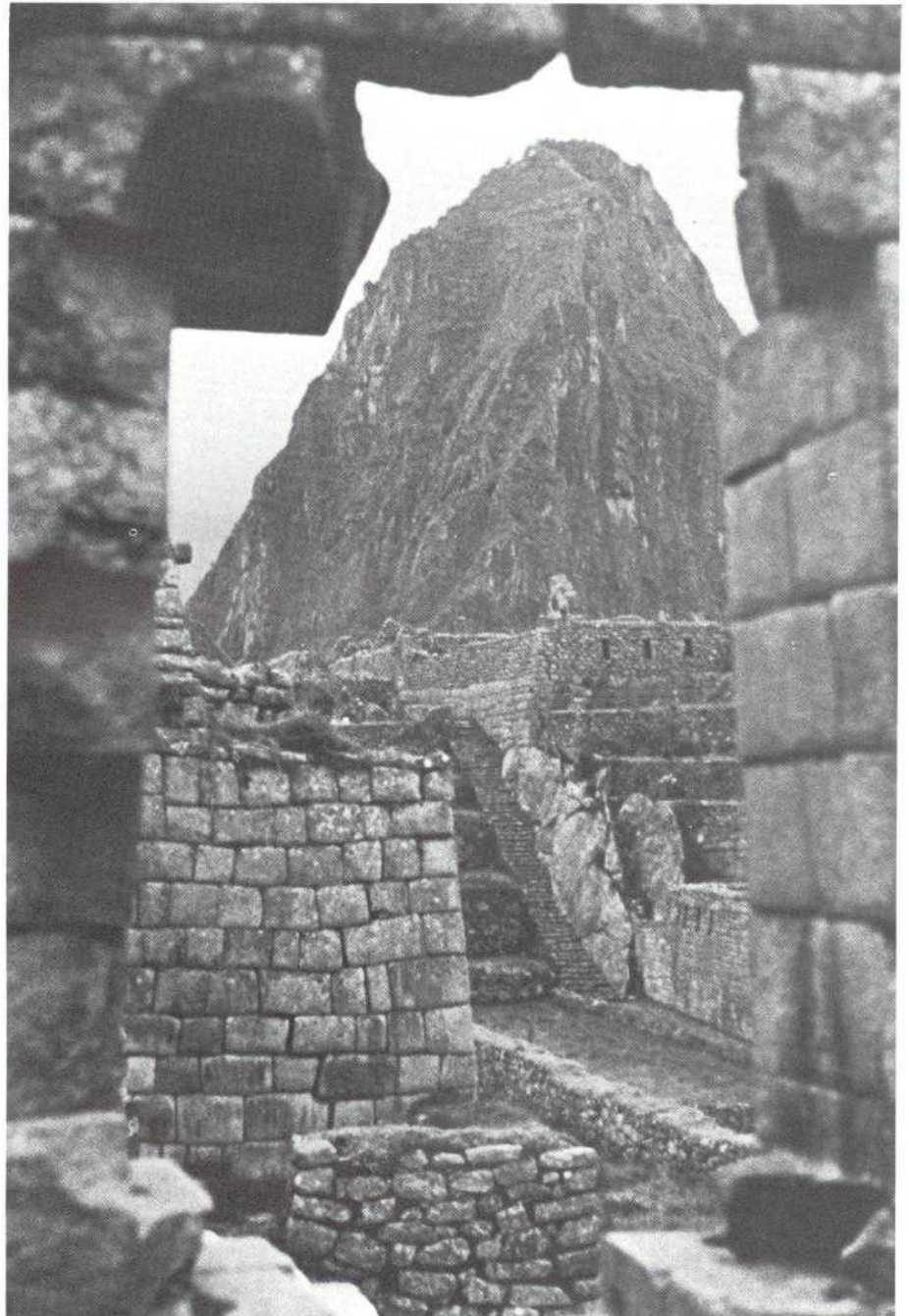
Founded in 1919, URSI has as its objectives the promotion of the scientific study of radio communications, the organization of research on an international scale and the standardization of measurement methods and instruments.

Approximately 450 scientists from 35 countries attended the Assembly held at the University of Lima. Dr. J. P. Voge, the French representative to the Interim Communications Satellite Committee (ICSC) from 1965 to 1969, was elected President of URSI for the coming three years.

As the aircraft broke through the clouds at about 5,000 feet to make its approach to the Lima Airport, I had to admit to a feeling of disappointment. Coming into Peru in the winter is not to see a beautiful country at its best. During this time of the year there is almost a continuous overcast along the coastal region.

Making our way from the airport to our hotel I couldn't help but be taken by the size of Lima. Before leaving Washington I had girded myself with all the information I could about Peru, yet I must admit to being surprised.

I had assumed Lima to be a city of about two million people. Perhaps the literature I had consulted was outdated because I was told on the spot that the number of people in metropolitan Lima, when estimated to include its environs just as we would



Machu Picchu, the sacred city of the Incas, discovered in 1911 by an expedition led by Dr. Hiram Bingham of Yale University.

*Dr. Bargellini is Senior Scientist
at COMSAT Laboratories.*

*Mr. Peterson is Editor of Path-
ways.*



The changing of the Guard in front of the government palace at the Plaza de Armas in Lima.

parts of Virginia and Maryland in metropolitan Washington, is about four million. Apparently, there had been considerable growth in recent years.

The University of Lima where the URSI meetings were held is situated approximately 17 miles from the city center and although bus transportation was provided between our downtown housing and the University, to really move about it was necessary to have a car. Armed with a rented Volkswagen and my Italian ways of driving (with gusto and spirit), I was able to move about a bit more freely. If I had to compare the traffic in Lima with that in the metropolitan Washington area I would have to say it is worse. And if I were asked to be specific, worse in actual driving or congestion, I would have to reply, both.

The URSI meetings were very constructive. There seemed to be a movement away from a purely scientific approach to radio science toward a closer alliance with technology and industrial applications. I believe an

example of this trend was in the election of Monsieur (Dr.) J. P. Voge, French representative to the ICSC from 1965 until 1969, as URSI President for the next three years. This is not to suggest that URSI will not continue as a scientific body—only that it will look with greater interest at the practical applications of its findings.

During our stay in Peru there were opportunities to visit the Peruvian Earth Station in Lurin operated by Empresa Nacional de Telecomunicaciones (ENTEL), about 20 miles south of Lima; the Jicamarca Radio Observatory of the Peruvian Geophysical Institute; and sites like Cuzco and Machu Picchu in the Highlands of the Andes Mountains containing many remains of the Inca civilization.

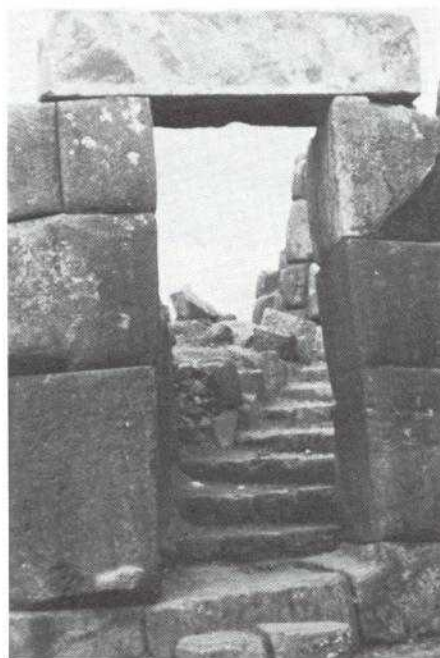
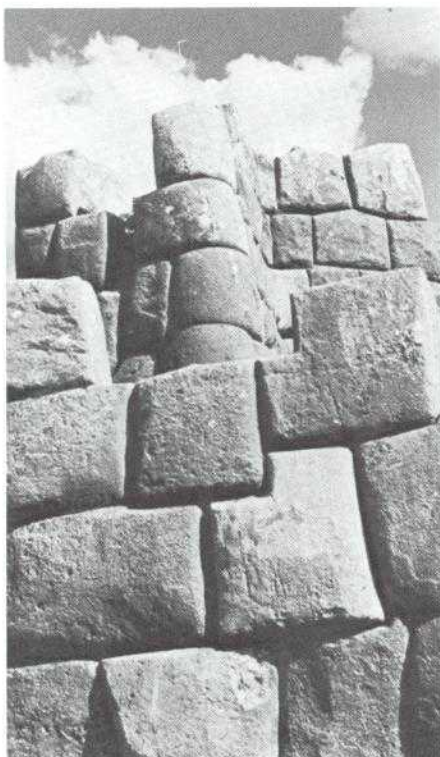
Getting to Cuzco was not as simple as making the decision to go. We took off at about 7 a.m., arriving over Cuzco within the hour. Unfortunately, the city, which has an altitude of about 12,500 feet, sits in a valley surrounded by mountain peaks reaching a height of 22,000 feet. The valley was fogged in and we were told land-

ing was impossible. So it was back to Lima.

After a delay of about an hour and a half we again took off from Lima. By the time we arrived over Cuzco the sun had burned away the fog, the weather was beautiful, and, as we made our approach through the towering peaks of the Andes, we were treated to some of the most magnificent scenery we had ever seen. And, once on the ground, we found ourselves in a world altogether different from that of Lima, in culture and in population makeup.

In downtown Lima there were some Indians to see, but most of the people were of Spanish descent with some other European representation. The features of some of the Peruvians reflected a mixture of Spanish and Indian blood. And, of course, the language is primarily Spanish with the dress being mostly Western.

As we moved away from Lima and into the hinterland, the Indian culture and dress became more prevalent and by the time we completed the four-hour train ride from Cuzco to Machu Picchu we found ourselves in



The Fortress of Sacsayhuaman was built by the Incas on a mountaintop plateau overlooking the City of Cuzco, apparently to defend the pass into the city. The stones, some weighing scores of tons and standing many times the height of a man, were transported over mountainous terrain from quarries 20 miles distant. Without beasts of burden or known means of locomotion, the methods used to construct such impressive embattlements remains a subject of considerable debate (note figures at upper left in center photo).

station at an elevation of about 6,500 feet, an overcast had developed and the final part of the ride by bus, which took us to an elevation of about 11,500 feet, was a real hair-raiser. Incidentally, Machu Picchu is the name of a mountain meaning something like "big mountain" or "big peak." It is also the name of the Inca city which pre-dated—and was not discovered by—the Spaniards who occupied the country in the 16th Century.

a totally different culture from that of Lima, the colorful dress of the Indians becoming dominant and the prevailing language Quechua.

But I shouldn't pass over the train ride so briefly. It was an interesting experience. We left Cuzco at about 6:30 a.m. on what is probably one of the most internationally operated nar-

row-gauge railroads in South America. The engine was a Canadian-built diesel locomotive, the coaches were made in Japan, the crew was Peruvian, and the passengers came from all over the world. The local people told us our train was a tourist special; that the more frequent trains carry the natives with their passengers of sheep, goats, llamas and alpacas.

The ride itself was exhilarating in that the weather was good and the scenery, going through the mountains, breathtaking. However, by the time we reached the Machu Picchu

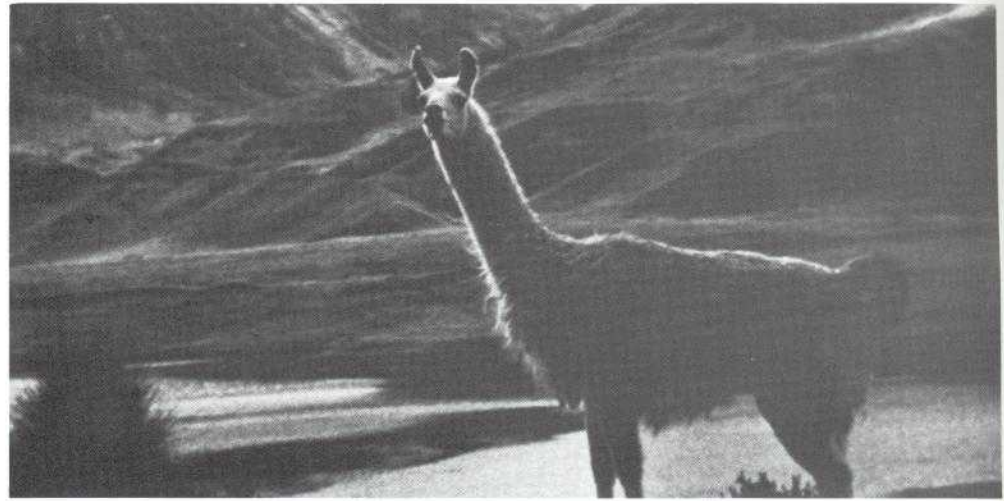
Outside of Lima, communicating with the natives became more difficult, if not outright impossible, especially when we got off the tourist track. Normally, my Spanish should have gotten me by, but in Cuzco and Machu Picchu conversations were three-way discussions. I would have to find an Indian to speak to who understood Spanish, then have my question translated into the Indian language, a sort of a double-hop, with my answer coming back the same route. They didn't seem to mind posing for pictures. Sometimes they would half-jokingly ask for tips which I was more than glad to give.

The ruins of the Inca civilization were amazing pieces of architectural engineering. It is still an unexplained mystery how huge stones, weighing tens and possibly hundreds of tons, could have been transported by human labor across mountainous terrain from quarries some 20 miles away to such sites as the Fortress of Sacsayhuaman near Cuzco. And then the construction, the finishing! The Incas did not know mortar, yet the stones were placed on stones with joints so perfect it's almost impossible to slip the blade of a knife into one. It had to be an amazing civilization.

Unfortunately there isn't much left as far as charts and drawings are concerned relative to the Inca civilization, so it's difficult to reconstruct their engineering methods. The animal most common to the Incas was, and still is, the llama which, I am told, will simply squat on the ground and refuse to budge if a load in excess of 80 pounds is placed on its back. Since the wheel was unknown to the Incas, possibly the giant stones were moved by massive amounts of manpower using stout logs as rollers.

Spanish historians accompanying Hernando Pizarro, who conquered the Incas in 1532, reported finding an extensive road system connecting the Inca Empire which, at the time, extended beyond the boundaries of Peru, comprising a part of Chile and all of Ecuador. Over the thousands of miles of roads runners in relays carried messages in a manner similar to our own pony express, only without the ponies.

There is an interesting appendage to this system of communications when one considers the terrain of Peru. Most Westerners are accustomed to living at relatively lower altitudes and experience little difficulty breathing. However, where the air is thin breathing becomes a real problem. On one occasion driving through a mountain pass at an altitude of almost 15,000 feet I experienced a strong headache and became short of breath, suffering quite a bit of discomfort. After coming down a few thousand feet these symptoms

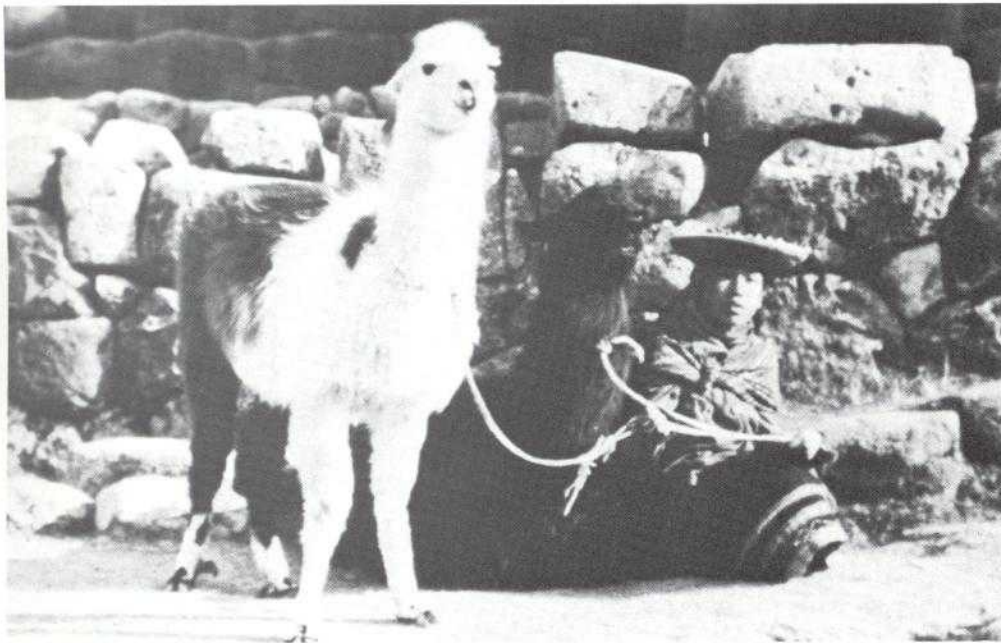


disappeared. You had to admire those runners who could cross the empire in days. Anthropologists maintain that the populace of the highlands have, on the average, bigger chests with greater lung capacity. It was quite common to see people between four and five feet tall. What they don't have in height they have in lung capacity.

History has it that the conquerors of the Incas made the effort to erase all traces of their civilization but found many of the foundations pretty sturdy and, instead, used them as the foundations for their own palaces and churches. In Cuzco today you can see streets laid out and building lines with the Inca stones still in place.

Some of the ruins of the Incas remained a mystery even to the conquering Spaniards. Dr. Hiram Bingham of Yale University, through the study of Indian and Spanish artifacts and documents, came to the conclusion that there was a sacred city of the Incas not found by the conquerors. In 1911, leading an expedition sponsored by the National Geographic Society, he made his way through the extremely difficult, jungle-infested territory to find the ruins of Machu Picchu, the sacred city located above the Urubamba River, approximately 13,000 feet above sea level on a mountain of granite. From the top of the





The character and culture of Peru are captured in these candid shots taken by Dr. Bargellini during his trip into the land of the Incas.



mountain it was easy to see why the Incas had selected this position to build their sacred city. Historians have concluded that the city remained undiscovered because the Spanish chose not to attack the fortifications, or ignored them, and thus failed to learn of the existence of the city.

Looking back into history you wonder how such an advanced civilization as that of the Incas, an emperor with literally tens of thousands of warriors at his command, could succumb to a small band of fanatically determined men. But then, superstition and belief in the gods eventually resulted in the emperor's becoming, either by his own will or weakness, a prisoner of the Spanish conquerors. Messengers had passed the word of the tall, white-skinned newcomers able to fire weapons which made thunder-like noises and killed from afar. Atahualpa, Emperor of the Incas, must have thought that he was faced not with an invasion of mortal men but of superior beings, deities or demi-gods from the East.

The culture we found in the interior was primarily an agricultural one, the

farmers bringing their products into market for sale. We were able to buy fruit such as oranges and avocados at about a third or one-fifth of what we would pay back home. One of the small markets we visited was in a village named Pisac, outside Cuzco, and I can remember its being about noon and our getting hungry. We bought lunch from one of the Indian vendors, consisting of fried trout, rice, beans and bread for 15 cents. We were a little concerned about the preparation but the food was excellent and we certainly couldn't complain about the price. The eating facilities, however, were primitive; you had a choice of sitting on the curb with the natives or leaning against a wall.

Prices for housing in Lima were pretty much American as were the services offered. Most of the delegates stayed at the Lima Sheraton and, if I recall correctly, the rate for a double room was \$29. It was possible to stay at something similar to a tourist home or a private pension for \$15 per day which included room and board. A good meal cost in the neighborhood of five dollars.

Returning to Lima I found much to reflect on before departing. But, being in the communications business, I couldn't help but wonder what that hardy, barrel-chested group of runners who plodded, one foot after the other, over, around and through the Andes, would think if today they could visit the Lurin Earth Station, just 20 miles away from Lima, and gaze at the machinery tying Peru into the rest of the world with instant communications.

It's something to think about.

PHOTOS BY DR. BARGELLINI

Measurement team completes IV-A in-orbit acceptance tests

BY
IRVING DOSTIS AND MARTIN BROWN

In-orbit acceptance tests of the first INTELSAT IV-A spacecraft were successfully completed recently at the Paumalu earth station, Oahu, Hawaii.

The primary purpose of the in-orbit tests is to detect any changes in satellite performance relative to the prelaunch acceptance test measurements (which are taken prior to



Members of the INTELSAT IV-A Test Team shown are, left to right, Martin Brown, Irv Dostis (Test Director), Chris Mahle, Vasilis Riginos, John Melville and Francois Assal. Hokan Holm, a member of the team, does not appear in picture.

launch at the Hughes Aircraft facility in California) and to establish a base line for all future in-orbit measurements which may be required.

To accomplish these measurements, the test teams normally ship, in advance of their arrival, all the sophisticated test equipment and tools required during their three-week stay. New test instruments were purchased for the INTELSAT IV-A series, not only to replace the travel-worn equipment which had been used for many years with the INTELSAT IV series, but to provide significant improvements in the measurement speed and dynamic

Mr. Dostis is Manager, Spacecraft Communication Testing, West Coast Project Office, COMSAT, and has served as Test Director for the last three in-orbit acceptance tests.

range. The requirement for more rapid measurements without loss in accuracy was necessary in order to test, in the short time allocated, the entire frequency re-use capability of the 20-transponder INTELSAT IV-A with its 32 output travelling wave tube amplifiers, six receivers, nine transmit and four receive beams.

The new test equipment in total included 32 boxes of scopes, meters, signal generators, precision attenuators, and minicomputer equipment. A total weight of approximately 1,700 pounds was shipped from COMSAT Labs to the Paumalu Earth Station. The equipment was installed within the elevated equipment room of the PAM-1 antenna where work is planned for its re-configuration to a state where it can permanently house the test equipment for use on future INTELSAT IV-A in-orbit acceptance tests and save the expense of shipping between the labs and Hawaii for each launch. Fred Seaman and Bud Bell of COMSAT Labs' Shipping/Receiving did their normal outstanding job of packing to ensure the transport of the equipment, some of which cost \$18,000 per unit.

Once the test equipment was unpacked by the test team, it was loaded



Test Director Irv Dostis during spacecraft antenna sidelobe measurement from his position inside the PAM-1 antenna.

in a crate and carefully hauled up into the antenna's upper cabin where it was precisely calibrated and connected to the antenna's feed. Calibration of the measurement setup takes approximately one to two days and is essential to achieve the absolute accuracy achieved (approximately ± 0.5 dB). This is somewhat remarkable if one stops to consider that the satellite range is greater than 22,300 miles and the signal strength arriving at the earth station from the satellite is generally less than one hundred billionth of a watt (0.000,000,000,01 watts or -110 dBW).

Performance parameters measured by the test team were: power level radiated by the satellite toward the earth (its e.i.r.p.), noise figure, frequency response, transponder gain, receiver characteristics, and the all-important antenna coverage capability and the global and spatially separated spot and hemisphere beams which give the IV-A its ability to achieve a 12,500-channel capacity.

At last report, INTELSAT IV-A (F-1), was functioning properly as it approached the coast of California. It will arrive in the Atlantic region in

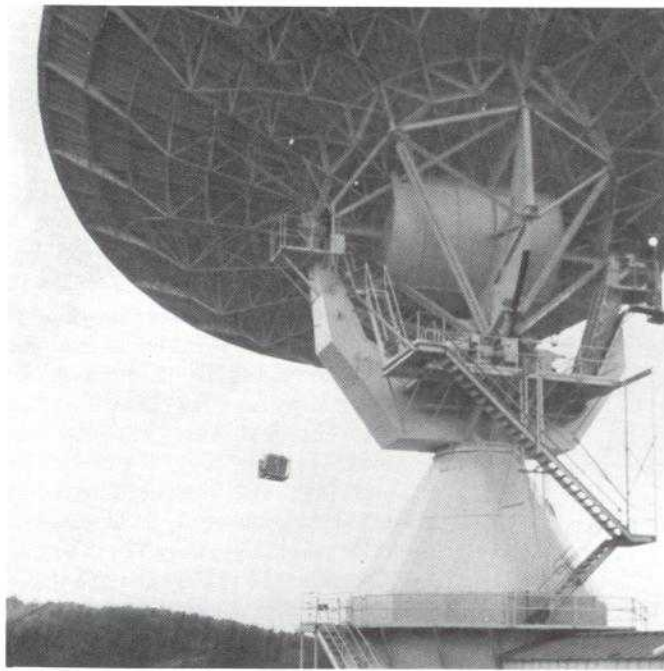


Part of the measurement equipment installed by the Test Team in the "cabin" (elevated equipment room).

December 1975 and replace the IV (F-3) as the primary satellite in early 1976.

In-orbit communication performance measurements have traditionally been conducted immediately after the launch of all successful INTELSAT satellites as part of COMSAT's responsibility as Management Services Contractor. The past tests performed

Mr. Brown is a Senior Transmission Engineer at COMSAT Headquarters and has participated in several INTELSAT IV in-orbit acceptance tests.



Measurement equipment being hoisted into position for installation into the elevated equipment room of the PAM-1 antenna.

COMSAT Technical Review marks fifth anniversary

The COMSAT Technical Review marked its Fifth Anniversary with the publication of the Fall 1975 issue. The CTR is currently being distributed to approximately 5,500 interested persons in government, industry, and scientific and education institutions in the United States and overseas.

Since November 1971, when the journal was first published, the CTR has achieved international recognition and acclaim as the only technical periodical devoted exclusively to the advancement of satellite communications technology, which continues to grow in complexity and scope. It has been quoted widely around the world in prominent technical publications.

In the nine issues, published in the Spring and Fall of each year, over 140 COMSAT/COMSAT GENERAL scientists and engineers have written a total of 80 papers that have contributed significantly to the achievement of the full potential of satellite communications which depends, in large measure, on past, present and future research and technical work. In addition, 15 authors have contributed 11 Technical Notes, some of which were subsequently expanded into papers.

The special INTELSAT IV issue (Fall 1972), nearly 300 pages of technical documentation on the spacecraft, earth stations and overall system, has emerged as a classic in technical literature. More than 25 COMSAT authors collaborated on this issue.

The editorial policy of the CTR is directed by an Advisory Board consisting of J.V. Charyk, William W. Hagerty, John V. Harrington and Sidney Metzger.

Pier L. Bargellini serves as Chairman of the Editorial Board which includes Robert D. Briskman, S. Browne, S. J. Capanella, William L. Cook, Denis J. Curtin, Jorge D. Fuenzalida, Joachim Kaiser, R. W. Kreutel, Terrence P. McGarty, H. J. Meyerhoff, Akos G. Revesz and Robert Strauss.

Stephen D. Smoke, Leonard F. Smith, Margaret B. Jacobs, Edgar Bolen and Michael K. Glasby comprise the editorial staff.

on the INTELSAT IV series have normally taken approximately two weeks of intensive effort to complete. However, in order to properly evaluate the new communications capabilities of the IV-A series, an additional week of testing was required. As was true of previous tests, significant support was received from the Spacecraft Control Center and Spacecraft Attitude Department in Washington, D. C., as well as from the TT&C personnel at Paumalu.

A specially selected team of engineers was assembled from various organizations within COMSAT to provide the wide range of skills needed to perform the measurements. Test team members were: Irv Dostis (Test Director), John Melville and Hokan Holm from the West Coast Project Office, Martin Brown from the Transmission Engineering Department at COMSAT Headquarters, and Dr. Christoph Mahle, Dr. Vasilis Riginos and Francois Assal of COMSAT Labs.

Hawaii still offers the excitement of a visit to paradise in the Pacific and because the IV-A had to drift past the operational INTELSAT IV satellites the test team was able to enjoy the luxury of three days off in a row, something which does not happen often in the middle of a test period. The three days were a welcome rest because our normal routine required waking up at 3:30 each morning in

order to time our tests with the daylight working hours of the many people who provided support in Washington, D.C.

The team spent its time during these days in a variety of ways including all those things that make Hawaii a fantastic vacation land, such as sailing off Waikiki, skin diving in a marine preserve at the bottom of an extinct volcano crater filled with coral reefs in Hanauma Bay, and body surfing at the famous Makapuu Beach Park.

Picture the expression on Chris Mahle's face after he was demolished by a wave at Makapuu because he had spent too much time discussing who was sorrier for his body surfing collision with one of those Hare Krishna fellows.

Of course we also spent a fair amount of our free time eating our way through the gastronomical delights of Chinatown and Honolulu. Our favorite dinner place turned out to be a very ordinary appearing Chinese restaurant on McCully Street which specialized in Mandarin food. We shared many experiences at this place including the pleasure of listening to the adventures of Dr. Bill English who, together with another test team, had just completed polarization experiments at PAM-1 and was returning from an NEC design review in Japan.

Plaque presented to COMSAT President



Dr. Joseph V. Charyk, COMSAT President, receives a plaque from Mr. Lim Jae Hwang (center) and Mr. Kim Nak-Seong, Pacific area operation representatives from the Republic of Korea. The plaque, presented on behalf of Mr. Chang Sung Tae, Minister of Communications for the Republic of Korea, read in part, "In appreciation of his contribution for the development of satellite communications of Korea."

PHOTO BY JAMES T. MCKENNA

Battle confirmed by Senate Committee



Appearing before the Senate Government Operations Committee during confirmation hearings following Presidential nomination to the National Study Commission on Records and Documents of Federal Officials are, left to right: Lucius D. Battle, Senior Vice President, Corporate Affairs, COMSAT; Herbert Brownell, New York attorney and an Attorney General in the Eisenhower Administration; and Ernest R. May of Belmont, Mass., a professor of history at Harvard University.

ASSOCIATED PRESS PHOTO

New Etam antenna begins work with primary path satellite

The new 105-foot dish antenna at the Etam, West Virginia, earth station recently began handling traffic over the INTELSAT IV primary path satellite. Etam's older antenna was temporarily taken out of service for maintenance and installation of a cross polarization feed to be used to perform communications experiments with an INTELSAT IV-A satellite.

Antennas at Etam and Andover, Maine are participating in the long and complex phase reconfiguration of Atlantic Region traffic from the 12-transponder INTELSAT IV to the new 20-transponder IV-A. The traffic transfer began in mid-November and will involve over 400 actual earth station activities by the time the traffic reconfiguration is completed.

The final Atlantic Region reconfiguration will be established early in 1976 following the successful launch of the second IV-A. Several earth stations now communicating through Etam will be permanently switched to the Andover earth station under the new traffic plan. COMSAT, as Management Services Contractor, believes this new configuration will provide the capacity for essential Atlantic Region communications services through mid-1977.

Upon completion of step two of the five-step traffic plan, primary path earth stations will point over to the 20-transponder INTELSAT IV-A satellite and begin commercial operations. The new IV-A has a capacity increase of two-thirds over the existing INTELSAT IV primary satellite. This increased capacity is achieved through a frequency re-use system incorporated into the satellite's system design.

Since COMSAT's east coast antennas can be interchanged for service, maintenance or testing, they have been designated Etam (primary) and Etam (major) instead of the usual Etam 1 and Etam 2. A similar designation has been assigned to the Andover antennas.

COMSAT donates sculpture for INTELSAT art program

COMSAT has contributed a mobile sculpture by Robert Amory to INTELSAT for display at its headquarters at L'Enfant Plaza. The gift was made under the art program in which member nations in INTELSAT offer works representative of their cultural heritages for display.

Mrs. Joseph V. Charyk, wife of COMSAT President Charyk, and one of the persons who assisted in the selection of the sculpture along with Lucius D. Battle, COMSAT Senior Vice President for Corporate Affairs, presented the sculpture in a recent ceremony at INTELSAT Headquarters. Mr. Santiago Astrain, Secretary General of INTELSAT, accepted the gift on behalf of the international organization.

The sculpture is one of Mr. Amory's "Mobilities" series exhibited last year at the American Institute of Architects Headquarters in Washington. It consists of a vertical series of

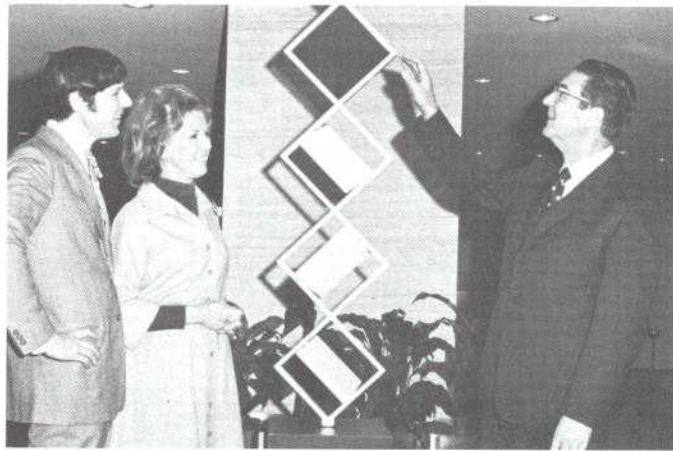


PHOTO BY
ALLAN W. GALFUND

Sculptor Robert Amory and Mrs. Joseph V. Charyk, wife of COMSAT President Charyk, present one of Mr. Amory's works to Mr. Santiago Astrain, Secretary General of INTELSAT, right, for inclusion in INTELSAT art display at Washington Headquarters.

panels, each suspended individually in a frame, with the entire sculpture free to rotate on a main pivot at the base. The material is solid aluminum with polyurethane enamel finish. The sculpture is 62 inches tall and rests on a plinth 30 inches tall. Its colors are black and white.

Mr. Amory, of Allston, Mass., developed the "Mobilities" series between 1973 and 1975. He produces sculptures in various sizes, ranging from indoor pieces to large outdoor works for architectural environments. All of his sculptures incorporate motion in response to wind or touch.

COMSAT Report awarded second place in 1975 Best-of-Industry competition

COMSAT's 1974 Annual Report to the Shareholders was judged second best in the Communications Industry in Financial World magazine's 1975 Best-of-Industry Annual Report competition.

The award was presented to COMSAT during the magazine's Annual Awards Dinner held recently in the Grand Ballroom of the New York Hilton Hotel. More than one thousand representatives from competing corporations were in attendance.

Robert B. Schwartz, Secretary and Director of Public Information; Stephen D. Smoke, Manager, Publications; and Judith S. Elnicki, Manager,

Shareholder Relations, were present to receive the second place certificate for COMSAT.

In notifying COMSAT of the award, Howard L. Sherman, Financial World Vice President and Annual Survey Director, stated in his telegram: "Congratulations. In the latest round of judging, your company's informative 1974 annual report has been selected as one of the top three winners of the category in which it is competing for additional honors. This assures it either a Bronze Trophy for first place, or a second or third place, Best-of-Industry Certificate."

COMSAT had previously earned a number of Merit Awards for reporting excellence, but this was the first time it was selected as one of the three finalists for the Bronze Trophy.

The Bronze Trophy in the communications industry went to Mid-Continent Telephone Corporation, Hudson, Ohio. Third Place Certificate went to United Telecommunications, Kansas City, Missouri. The Dayton-Hudson Corporation of Minneapolis garnered the 1975 Gold Trophy for the best annual report of the year.

PHOTO BY JAMES T. McKENNA

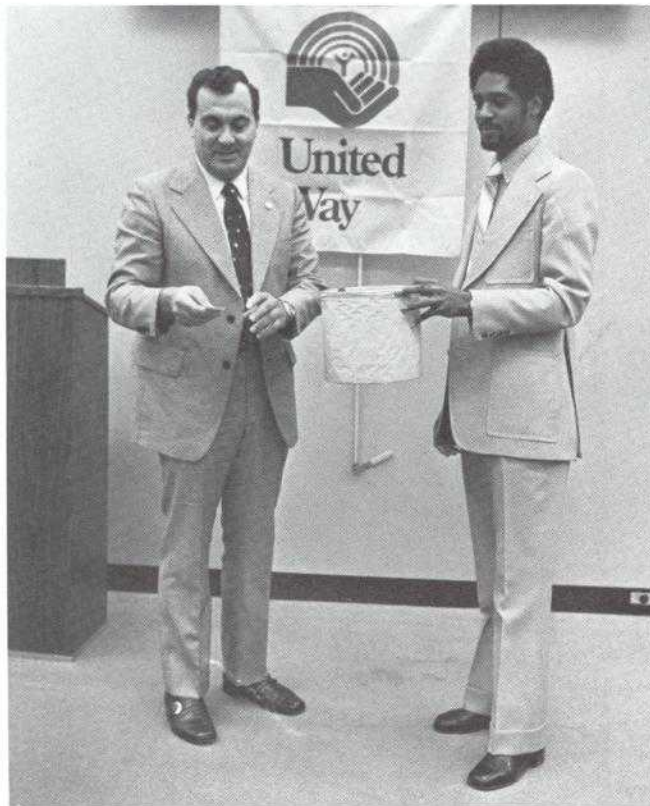


Judith S. Elnicki, Stephen D. Smoke and Robert B. Schwartz show COMSAT's Annual Report Award from Financial World magazine to Lucius D. Battle, Senior Vice President, Corporate Affairs, second from left.

Corporate United Way drive sets record



COMSAT Senior Vice President Lucius D. Battle (right, upper photo), Campaign Chairman for the COMSAT United Way Drive, presents COMSAT's check for \$14,000 to Ken Unzinger, Director of Corporate Gifts for the United Way, as Mel Williams, COMSAT co-chairman, looks on. In lower photo, Paul Mehler, a "loaned executive" to the United Way, assisted by Personnel's Williams, picks the winner of the prize donated by COMSAT's Mary Huggett.



PHOTOS BY
ALLAN W. GALFUND

Contributions from COMSAT and COMSAT GENERAL employees and the Corporation resulted in an increase of 30 percent over the 1974 drive with aggregate contributions to the United Way amounting to \$45,670.

Employees' contributions totaled \$28,465, an all-time record; with a Corporate Gift of \$14,000 added and \$3,205 in Corporate matching funds.

Campaign Chairman Lucius D. Battle expressed pleasure with the results and pointed toward such activities as the bake sales conducted by the team captains and the raffle of the hand-crocheted stole donated by Mary Huggett as "above and beyond" events contributing to the record drive.

Daniel Swearingen of COMSAT GENERAL won the additional two vacation days from among those having contributed \$26 or more or pledged one dollar or more per pay period. Robert Rountree of the U.S. INTELSAT Division won the crocheted stole.

According to Mr. Battle, "Credit for the successful drive must go to the employees and Mel Williams for his conscientious efforts as co-chairman."

Labs senior scientist receives City of Columbus award

Labs Senior Scientist Pier L. Bargellini was among the scientists honored recently by the International Communications Institute in Genoa, Italy.

As the recipient of the City of Columbus Award, presented on behalf of the City of Columbus, Ohio, Dr. Bargellini was cited as the "Engineer, Scientist, University Professor, who has contributed with his work in Italy and abroad to the continued advance of telecommunications."

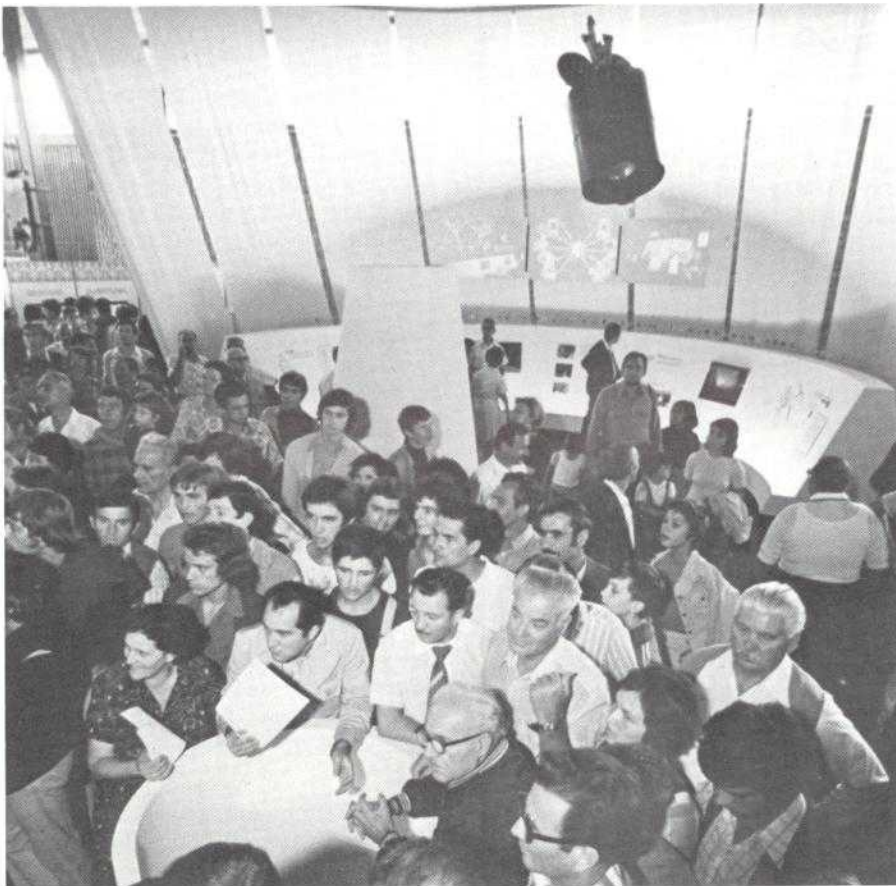
Labs delivers nickel-hydrogen cells to U.S. Navy

Labs Engineer Joseph F. Stockel assembles newly-developed nickel-hydrogen cells for delivery to the U.S. Naval Research Laboratory. The cells will be fabricated into a battery and placed aboard the Navy's Navigational Technology Satellite (NTS-2) planned for launch in the Fall of 1976. The battery will serve as the satellite's primary power source during periods of eclipse.

PHOTO BY BILL MEGNA

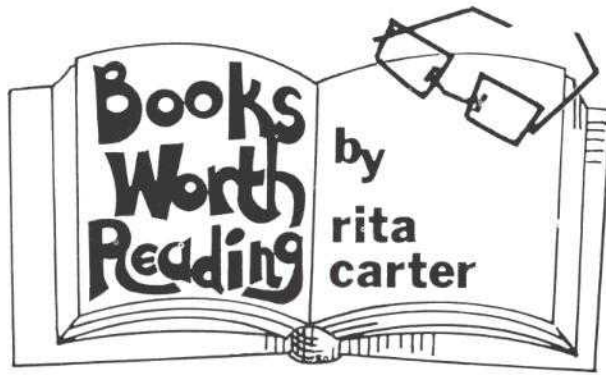


COMSAT exhibit viewed in Yugoslavia



A COMSAT display forms the backdrop for visitors to the United States space exhibit held recently in Belgrade, Yugoslavia. COMSAT supported the United States Information Agency, USIA, in providing the slide presentation, "New Communications Era," murals of the global communications satellite system and a satellite model. In a letter to COMSAT's Allan W. Galfund from the Deputy Assistant Director of USIA, the agency expressed its gratitude for "... having made available the items you loaned us for use in our exhibit, Satellites—Servants from the Sky." More than 93,000 people viewed the exhibit.

USIA PHOTO



Minicomputers for Engineers and Scientists by G. A. KORN; 303 pp.
 Nearly one-half of all computers used today in the United States are the new minicomputers. This book is a simplification and codification of manufacturers' literature on minicomputers. It also includes extensive

literary references for further study on this subject.

Minicomputers for Engineers and Scientists is written to attest to the extraordinary talents of these remarkable little machines and their increasing power and feasibility in a great variety of engineering, technical and scientific applications in areas ranging from manufacturing and education to service bureaus and government.

This book should be especially useful to those who are thinking about investing in one of the new minicomputers and wanting to gain a better understanding of the units available, where you can see them and what you can expect from them. It should also help those who may already have a minicomputer and want to realize all its exceptional possibilities. Also, the book informs engineers and scientists about the principal features of minicomputers and micro-computation linking the mathematical abilities of minicomputers with the mathematical requirements of the work of scientists and engineers, and pointing out how a small machine may possess sufficient computing power to free researchers and engineers from bondage to a computing-center bureaucracy.

Dr. Korn defines a minicomputer as a digital computer whose minimum configuration (4,000 words of memory, teletypewriter) costs under \$20,000 and which usually employs short computer words to represent data and computer instructions. (Section I, p. 2).

Divided into seven sections, the book deals with such topics as: the computer's role as a live mathematical model; the instruction sets, addressing schemes and common opinions of single address minicomputers; the operation of minicomputer front-panel controls, peripherals and system software; assembly language and assembler functions, with examples; digital-computer interface systems; trends in present and future minicomputer architectures, including the new bus-oriented systems; the essential features and possibilities of the principal minicomputer applications.

The sections are called chapters by Dr. Korn, yet the table of contents shows that each chapter is much

New Books

Reference

- Congressional Directory. 94th Congress, 1st session, 1975.*
EEM/Electronics Engineers Master 1975-76. United Technical Publications.
International Frequency List. Volume V, parts B, C, D with Supplements and Prefaces. ITU, May 1, 1975.
World Aviation Directory. (including World Space Directory) Fall, 1975 ed.

Proceedings & Reports

- Eascon '75 Record. IEE Electronics and Aerospace Systems Convention.* Washington, D. C. September 29-October 1, 1975.
INTELSAT IV Case History Volume I: Communication Spacecraft Tech Principles and Volume II: The International Satellite Communications System INTELSAT IV. Hughes Aircraft.
International Conference on Communications, IEEE. San Francisco. June 16-18, 1975.
International Monetary Fund Annual Report, 1975. IMF.
International Monetary Fund 26th Annual Report on Exchange Restrictions, 1975. IMF.


Books

- Aspen Notebook on Government and the Media.* WILLIAM L. RIVERS and MICHAEL J. NYHAN, eds. Aspen Institute.
Aspen Handbook on the Media, 1975-76 ed. Aspen Institute.
 BLUKIS, J. and BAKER, M. *Practical Digital Electronics: An Introductory Course.*
 BOX, GEORGE F. and JENKINS, G. M. *Time Series Analysis. Forecasting & Control.*
Occupational Safety & Health Cases, Volumes I, II. (Bound 1974-75 volumes) Bureau of National Affairs.
A Guide to Consumer Markets, 1975-76. Conference Board
Statistics of Communications Common Carriers, 1973. FCC.
 FINK, DONALD G. *Electronics Engineers Handbook.*
 MIYA, DR. K. *Satellite Communications Engineering.*
 PEATMAN, JOHN B. *The Design of Digital Systems.*
 STEELE, R. *Delta Modulation Systems.*
 VERNON, ANDREW. *Transistor Theory for Technicians and Engineers.*

more comprehensive than an ordinary chapter, which is commonly a complete treatment of a single subject. Chapters 4, 6 and 7 seem to be oriented more toward the users of minicomputers, while chapters 2, 3 and 5 are more concerned with the theory making that use possible. Each chapter, except chapter 1 which is planned as an introduction to the subject of the whole book, begins with its own "Introduction and Survey" and each chapter, including chapter 1, closes with an extensive list of "References and Bibliography," literature used by the author in formulating the information contained in that chapter.

There are many special features contained in *Minicomputers for Engineers and Scientists* that will be found to be of immense value to engineers as well as management and research supervisors, who need to compare features and costs of the many new minicomputers available. In textbook fashion, the most important phrases are printed in bold-face type, making it possible for the reader to quickly identify information for which he is looking. Besides an index, there is an Appendix of 12 tables which has a dual advantage: these tables on number systems, data word formats and logic circuits are useful reference tools for engineers, and Dr. Korn's presentation of these items in the form of boxed tables has made it possible to present practical reference material in concise form without cluttering the text of the book. The bibliographies at the end of each chapter are a third special feature, giving the reader a source of greater in-depth coverage of many of the ideas presented.

The index does not seem to be as complete as the table of contents and text. Yet, all in all, *Minicomputers for Engineers and Scientists* is one necessary piece of literature for anyone interested in how to put to best and widest use the new breed of powerful little computers, especially if one is operating within the framework of the resources of the United States in that field.



The following represents a sampling of questions frequently referred to the Personnel Office, and their answers, considered of general interest to employees.

What is covered by COMSAT's Group Medical Insurance?

The COMSAT Group Medical Insurance Plan covers treatment for non-occupational injuries and illnesses. Normally all medical charges will be covered, with few exceptions. The major exceptions are: (1) cosmetic surgery, (2) routine physicals, (3) routine maintenance of the eyes, and (4) maintenance of the teeth (care and restoration of the teeth is covered under the COMSAT Dental Plan).

How does the Major Medical deductible work?

The Major Medical deductible is one percent of your base annual salary; the maximum deductible is \$100 per calendar year. If you have dependent coverage, only two family members are required to satisfy a deductible. Expenses for all covered items will then be reimbursed such as prescription drugs, family physician fees, medical treatment appliances, etc., at 80 percent.

Why are charges for certain services provided in a hospital emergency room reimbursed and others not?

Charges for services provided in a hospital emergency room are reimbursed if the treatment provided is for injuries sustained as the result of an accident. If treatment is rendered due to illness, the lab and X-ray work is covered under the Lab and X-ray provision of the Plan. All other covered charges are subject to the Major Medical provision of the Plan.

I am in my fifth year of service with COMSAT and now receive my new vacation eligibility but not the new sick leave eligibility. Why?

Vacation eligibility is based on calendar years of service, and sick leave is based on anniversary dates. Therefore, you were entitled to the new vacation eligibility once you entered your fifth calendar year of service, but

you will not be entitled to the new sick leave schedule of benefits until you have completed five full years of employment with the Corporation. For example: Employee A was hired on 1-10-71, Employee B was hired on 12-20-71, both were entitled to three weeks vacation on 1-2-75. Employee A was not eligible for the new schedule of sick leave benefits until 1-10-75, and Employee B will not qualify for the same schedule of benefits until 12-20-75.

When may I change the percentage of my contribution to the Thrift and Savings Plan?

You may increase or decrease the percentage of your contribution by completing a CSC Form 843, and forwarding it to the Personnel Office at least 30 days prior to the beginning of any calendar quarter. The change would become effective the first pay period ending in the new quarter.

When am I allowed to change investment direction(s) in the Thrift and Savings Plan?

The investment direction(s) may only be changed once a year. A memorandum is distributed to all participants in March of each year advising them of the opportunity to effect the appropriate change(s). To initiate a change, a CSC Form 843 must be completed and forwarded to the Personnel Office by the first week of April.

What is the cost of the penalty imposed by the Thrift and Savings Plan because of withdrawal from the Plan?

The penalty does not result in a direct cost to the Thrift and Savings participant making a withdrawal from the Plan. However, the employee is suspended from participation in the Plan with attendant loss of the matching contributions by the Corporation. The loss of the matching contributions constitutes the penalty.

Questions pertaining to the answers provided in this article should be addressed to Mel Williams, room 7196, tel. ext. 6388 at the Plaza.

Network Bits

Field Correspondents

Andover

Joanne Witas

Cayey

John Gonzalez

COMSAT General (Plaza)

Jean Baldwin

Etam

Bev Conner

Fucino

Sandy Tull

Jamesburg

Warren Neu

Labs

Carol Van Der Weele

New York

Stephen Keller

Paumalu

Bob Kumasaka

Plaza

Gloria Lipfert

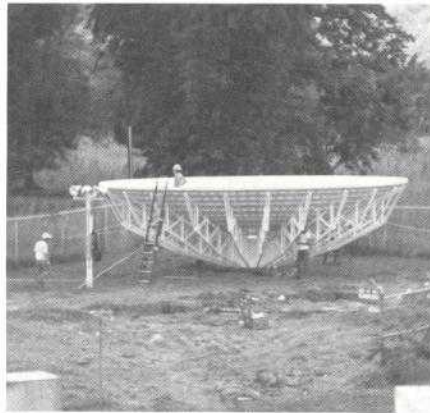
Santa Paula

Pat Hogan

Southbury

Eileen Jacobsen

Shoemake and COMSAT GENERAL's **John Ebelink** and **Bela Benyasz** the principals involved.



Dish gets finishing touches.

Our newest addition to the Cayey family, **Alberto Santiago**, is undergoing on-the-job training with **Otto Irizarry**. **Efrain Flores** attended the Supervision Workshop at Headquarters. Efrain's son has applied for the COMSAT scholarship.

Your correspondent has good days and bad days. After a successful fishing trip in Guajataka Lake in the Island it was into the hospital for surgery.

—**John Gonzalez**

ETAM. All satellite traffic was placed through the new Etam II antenna as of November 2. Station personnel have been deeply involved in getting all aspects of the second antenna in an operational status. Much work is to be accomplished during the two to three weeks the antenna is out of service. This has been our first opportunity in over seven years to perform maintenance on Etam I.

The CEA sponsored another Long John Silver Fish Fry recently at the canteen. As of this date plans are still incomplete for the annual Christmas party. The CEA will once again purchase Christmas gifts for members' children ages 12 and under.

From all of us to all of you our best wishes for a happy and safe Holiday Season.

—**Bev Conner**

FUCINO. The station has recently undergone a change in COMSAT personnel: the **Riddles** have departed for Cameroon and the **Pavlaks** for Brazil where Darrell and Don will be T&C Supervisors. Newly-arrived at Fucino are the **Tulls** and the **Andersons**, Jack

from Headquarters and Chuck previously at Jamesburg. **Lee Johndahl** remains at Fucino as T&C Supervisor. These three comprise the complement of American personnel from COMSAT located at our station.

The staff of Fucino extends its holiday wishes to the employees and families of COMSAT, COMSAT GENERAL and INTELSAT.

—**Sandy Tull**

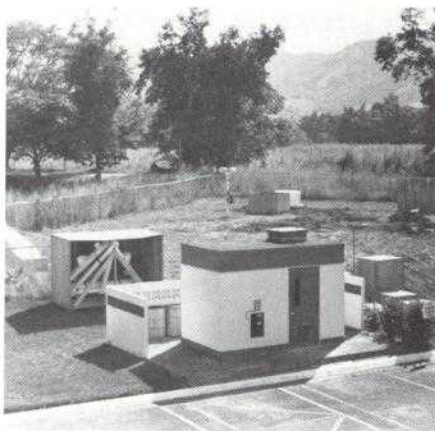
PAUMALU. The Paumalu CEA helped usher in the holiday season for station employees and their guests with a dinner show at the Monarch Room of the Royal Hawaiian Hotel on Waikiki. Following cocktails in the Surfroom Terrace overlooking beautiful Waikiki Beach, guests enjoyed their dinner of Kamaaina chicken or steak. The highlight of the evening was the entertainment featuring John Rowles, one of the most popular entertainers in Hawaii.

In order to accommodate employees on shift work two parties were held. The first-nighters included Teams 2 and 4 and a few Facilities and Administrative personnel and their guests. The second-nighters were made up of Teams 1 and 3 and the remaining station personnel and their guests.

The Paumalu CEA, chaired by **Stanley Holt** and assisted by his Team 4 members, are to be commended for their very successful effort.

Genon Usita, Sr., became the thirty-first employee at Paumalu to join the ranks of current staffers with more than five years service with COMSAT and was presented with his five-year pin by Station Manager **Glenn Vinquist**. Only five of the staff have less than five years with COMSAT.

Four of the station personnel have recently returned from the Mainland. **Charles Ogata**, Operations Supervisor, attended the Effective Supervision Workshop held at the Plaza. Charlie visited friends in Baltimore before returning home. **Yoshiaki Daikoku**, Senior Technician, shed his civilian clothing for a military uniform to participate in special Air National Guard training in Knoxville, Tennessee. Master Sergeant Daikoku, a member of the Hawaii National Guard, was selected to attend the NCO Academy as part of his annual military training. While on the Mainland he spent two weeks visiting



MARISAT site construction.

CAYEY. After months of waiting, the MARISAT site project is under way with work being performed by prime contractor Scientific Atlanta assisted by sub-contractor Bussman and Associates. COMSAT GENERAL and station personnel helped to get the ball rolling with Scientific Atlanta's Marvin

friends and relatives following his Guard assignment.

Tim Kolb, Senior Technician, attended the Hewlett-Packard 2100A Computer Course held in Cupertino, California. **Alan Prevo**, Operations Supervisor, also spent a week in Washington attending the Supervision Workshop.

Technician **Tom Akimoto** passed out cigars and candy to his fellow employees to celebrate his wife **Joyce's** presenting him with their first son (second child), **Chad Thomas Ernest St. Germain**, recently retired from the County Fire Department after 23 years of service, has joined our station custodial force.

—**Bob Kumasaka**

PLAZA. Congratulations to **Hubert** and **Elizabeth Keel** on the birth of their fourth son **Andrew** and to **Mike** and **Deniese Bond** on the birth of their second child and first boy **Eric Matthew**. Personnel's **Mosetta Whitaker** and **Michael Blackmon** of Finance were married in Las Vegas in October.

New arrivals at the Plaza include **David B. Abercrombie**, **George Birchette**, **Evelyn Braswell**, **Vernon Brown**, **Luciano Fasano**, **Steve Franco**, **Donald H. Gleason**, **Judith K. Hillyer**, **Estil V. Hoversten**, **Lisa Rich** and **Robert L. Trammell**.

A baby shower was given for **Lidia**

Oliva, a data technician in the Plaza Computer Center, by 20 of her friends.

—**Gloria Lipfert**

SANTA PAULA. As the rest of the country approaches mid-winter, the orange season comes to Santa Paula. Assisted by bright sunny days and temperatures in the 70's, another bumper crop of navel oranges is expected in January and February.

The Santa Paula station is situated in the center of a Valencia and Navel orange grove four miles north of Santa Paula. Part of the area cleared for the station is now being replanted. In addition to replacing orange trees, 19 winter-bearing avocado trees have been planted with more to follow next spring. The newly-planted trees will bear fruit in three to five years.

Outdoor sports continue to occupy station personnel during the mild Southern California weather. **Jeff Gnass** is learning how to ride his new, custom-built bicycle. **Karl Jesinghaus** has overhauled his scuba gear for the lobster season. **Dennis Hill**, **Gordon Johnson** and **Frank Meyer** continue to ride motorcycles and wonder why **Charles Kraft** and **Jim Peasley** prefer bicycles.

—**Pat Hogan**

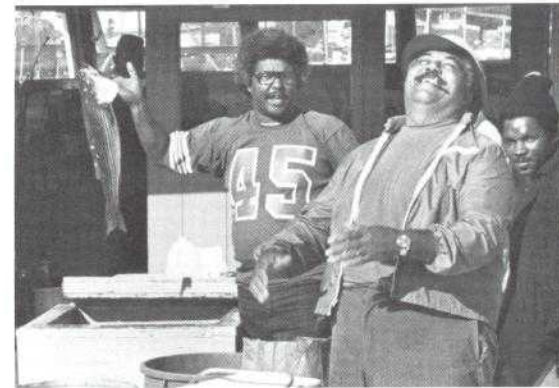
SOUTHBURY. Congratulations to **Mary** and **Gary Firtick** on the birth of their son **Dean** on November 1. Additional congratulations go to

Gary for taking first place in the United States in the Amateur Radio CQ Magazine DX (talking to stations in foreign countries) Contest in 1975.

Roger Miner has moved into a new home equipped with a boat dock fronting on Lake Quassapaug in Middlebury, Connecticut. "**Bart**" **Bartlett** has had his new office partitioned off recently and painted "sleepy hollow." He is planning to decorate the walls with a few of his own oil and water color paintings.

—**Eileen Jacobsen**

CEA fishing tournament



COMSAT's **John Newman**, right, "breaks up" while listening to **Mel Harley** describe the fight his catch put up during the recent CEA sponsored fishing tournament (upper photo). **John Fritz** of COMSAT General (lower photo) displays his prize-winning, ten-pound-plus rockfish. The Fall Fishing Tournament is one of the activities offered by the CEA to its members and their families. Some others include discount tickets to the Capital Centre, the Annual Christmas Dance, golf tournaments and discounts on tour packages and admission tickets through membership in Walt Disney's Magic Kingdom Club.



Patent Incentive Awards presented at Labs



Patent Incentive Awards were presented to 20 Labs employees recently by Labs Director **B. I. Edelson**. Shown following the presentation are, left to right, standing, **Michael Onufry**, **Robert Gruner**, Director of Transmission Systems Laboratory **Robert Davis** (looking on), **Su Mon Chou**, **George Welti**, **Paul Koskos** and **Chester Pentlicki**. Seated are, left to right, **Geoffrey Hyde**, **William Allen**, **Dr. Edelson**, and **Krishna Virupaksha**. Receiving awards but not appearing in the picture above were **James Allison**, **Joseph Campanella**, **Richard Cooperman**, **William Getsinger**, **Laurence Gray**, **Eric Kauffman**, **Joseph Lindmayer**, **Louis Pollack**, **William Schmidt**, **William Sones** and **Henri Suyderhoud**.



First class celebrates graduation from Basic Guitar Course.



COMSAT General signs credit agreement

COMSAT GENERAL has entered into a revolving credit and loan agreement which contemplates borrowing by COMSAT GENERAL of up to \$50 million, as needed, to meet financial requirements for its various programs.

The agreement was signed with Chase Manhattan Bank, N.A., of New York City, which has committed to lend up to \$15 million. COMSAT GENERAL said it anticipates that, in addition to Chase, eight other banks will participate in financing the remaining \$35 million, and COMSAT GENERAL intends to request that those banks become parties to the agreement. Chase will act as agent for the other banks.

COMSAT GENERAL, established in 1973 as a subsidiary of COMSAT, has been financed to date in the amount of \$200 million by COMSAT. This is the first time COMSAT GENERAL has sought outside financing.

The agreement provides for a three-year revolving credit loan, to be followed, at COMSAT GENERAL's option, by a four-year term loan, both up to a maximum of \$50 million. The term loan would be repayable in 16 quarterly payments unless prepaid earlier.

FCC renders decision in rate case

Editor's note. *The following press release was issued by COMSAT on November 26 after the announcement that day by the FCC of its decision in the COMSAT rate case. Further information was not available at the time Pathways went to press.*

The Federal Communications Commission has rendered a decision in the long-pending investigation into the rates COMSAT charges for services provided through the global communications satellite system.

The Corporation has received only the Commission's press release and a dissenting statement by Commissioner Washburn joined in by Commissioner Lee. Without detailed analysis of the Commission's Order which will not be available for several days, it is not possible to assess the precise impact of the Commission's decision.

It appears that the Commission has rejected several of the major positions

COMSAT took in the case. For example, the Commission appears to have refused to give any recognition to COMSAT's special situation as a start-up company during the early years after its incorporation. We believe that the Commission's failure to recognize such special circumstances not only denies COMSAT's shareholders reasonable compensation for the special, initial investment risks they took, but that it may well create future problems by tending to discourage risk investment in other, similar start-up ventures that are rate regulated. In the view of the COMSAT management, it seems particularly ironic that COMSAT has successfully met the challenges involved in an uncharted field and that this very success is now working to the detriment of the Corporation's shareholders.

The Corporation will evaluate the Commission's Order after it becomes available and will determine what further steps will be appropriate.

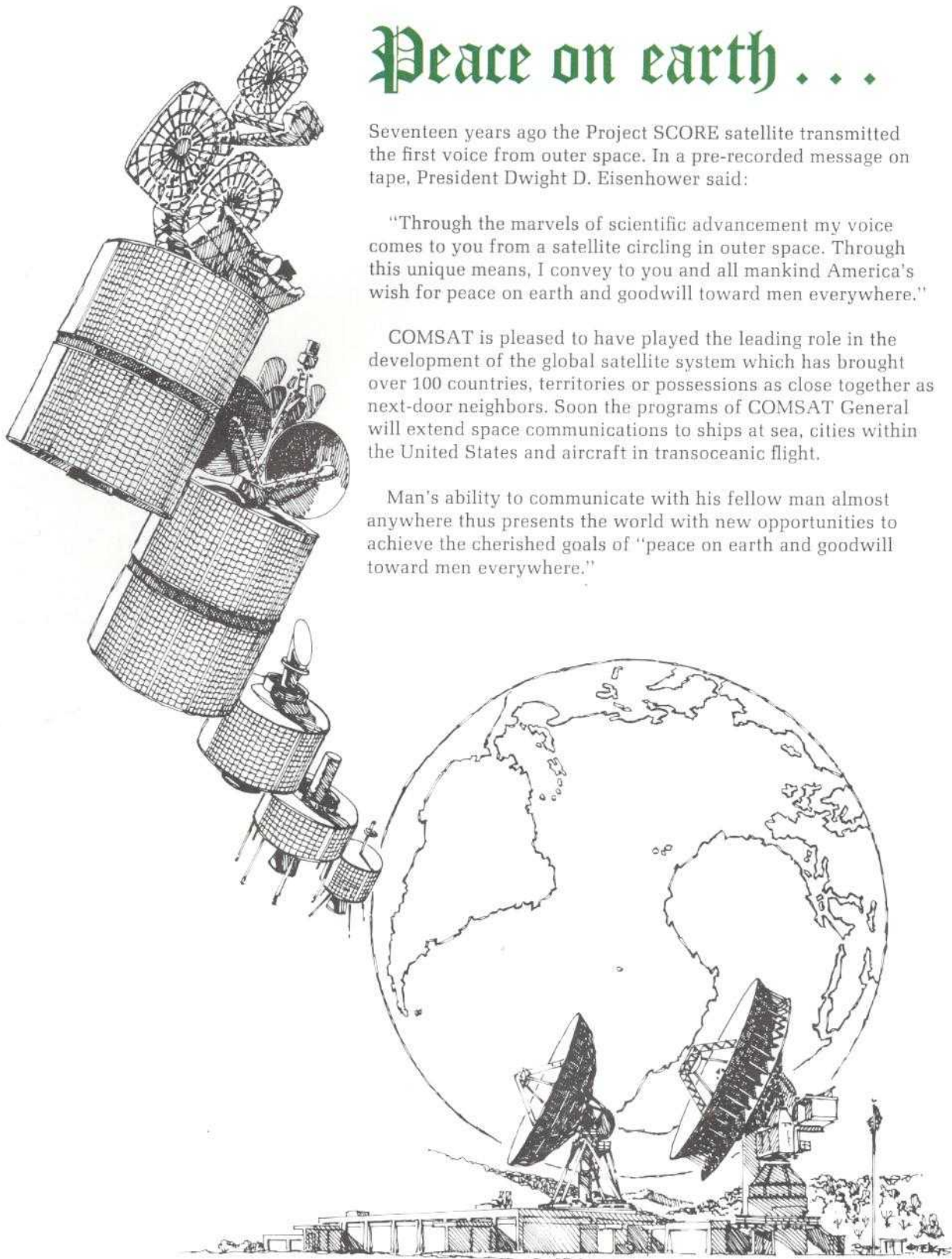
Peace on earth . . .

Seventeen years ago the Project SCORE satellite transmitted the first voice from outer space. In a pre-recorded message on tape, President Dwight D. Eisenhower said:

"Through the marvels of scientific advancement my voice comes to you from a satellite circling in outer space. Through this unique means, I convey to you and all mankind America's wish for peace on earth and goodwill toward men everywhere."

COMSAT is pleased to have played the leading role in the development of the global satellite system which has brought over 100 countries, territories or possessions as close together as next-door neighbors. Soon the programs of COMSAT General will extend space communications to ships at sea, cities within the United States and aircraft in transoceanic flight.

Man's ability to communicate with his fellow man almost anywhere thus presents the world with new opportunities to achieve the cherished goals of "peace on earth and goodwill toward men everywhere."



COMSAT COMMUNICATIONS SATELLITE CORPORATION
COMSAT GENERAL CORPORATION
WASHINGTON, D.C.