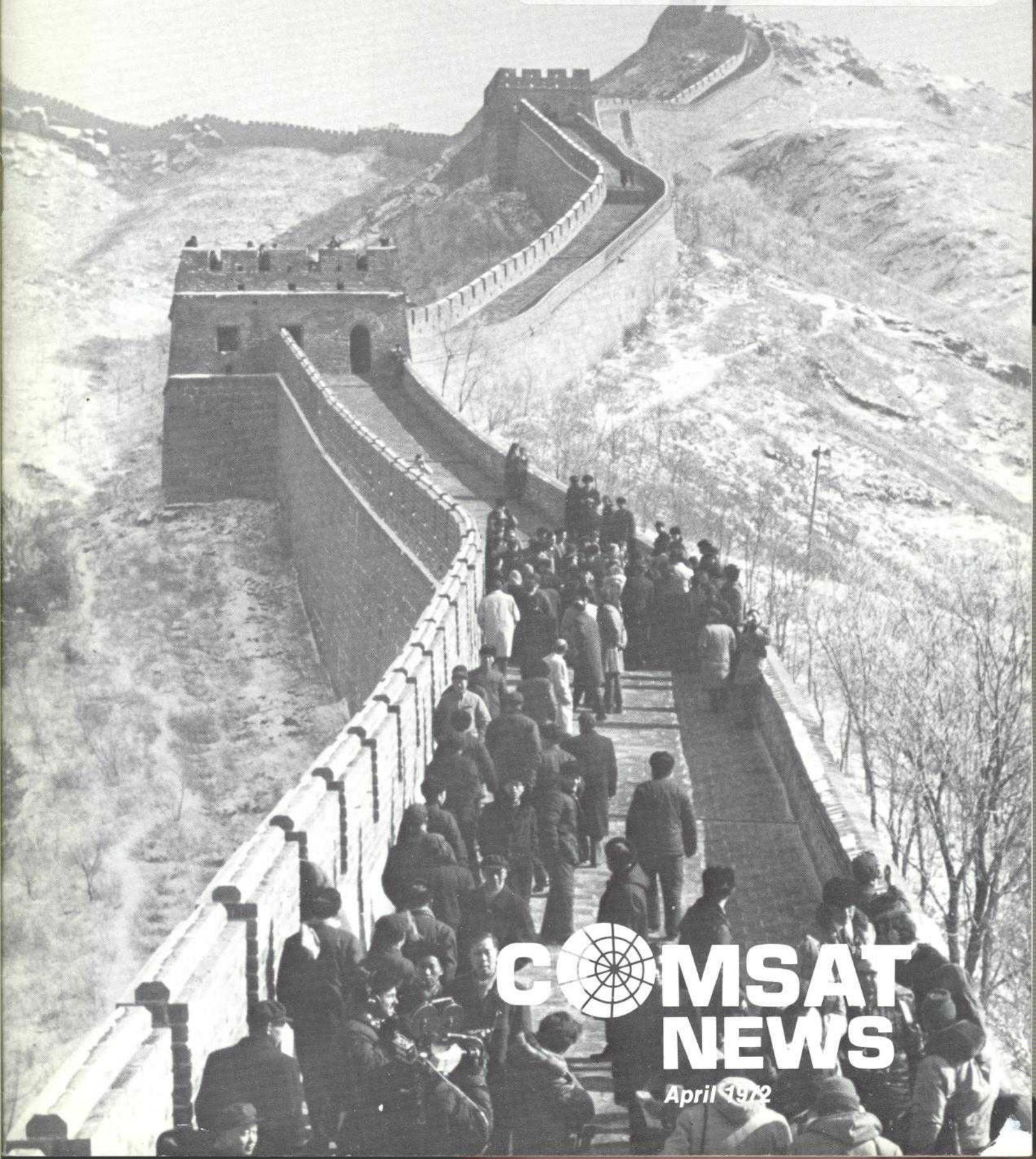


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**COMSAT
NEWS**

April 1972

COMSAT NEWS

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On the cover

The Great Wall: This picture appears on the cover of COMSAT's 1971 Annual Report to Shareholders. It was taken during President Nixon's visit to the People's Republic of China and represents the TV coverage and other communications services provided from China via satellite.

April 1972—7th Year, No. 2

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Matthew Gordon, Assistant Vice President for Public Information
James H. Kilcoyne, Jr., Editor

FCC staff eyes limited open entry domestic services

By HALE MONTGOMERY

A Federal Communications Commission staff report issued on March 15 recommended a policy of limited entry to all qualified applicants who seek to provide domestic satellite communications services.

The proposed Report and Order is subject to oral arguments, set for May 1, before action by the full Commission on the form of any final long-awaited domestic satellite policy.

■ *Mr. Montgomery is a COMSAT senior information officer.*

Regarding COMSAT's position, the Common Carrier Bureau staff recommendation said COMSAT could not both (1) lease satellite capacity to AT&T and also (2) own and operate a separate multipurpose system of its own, as COMSAT has proposed in two filings.

"The Bureau argued that COMSAT should not be in the dual position of supplier of service to AT&T and a common carrier serving the general public," an FCC news release said.

The staff paper outlined a third option open to COMSAT: (3) to own system facilities jointly with AT&T, and serve any customers other than AT&T from COMSAT's share of the jointly owned facilities.

In addition, the staff recommendation said COMSAT should be prohibited from establishing domestic earth stations in Hawaii, Alaska and Puerto Rico, points now served by the INTELSAT system (a limitation not applying to other potential applicants); and COMSAT should be required to form a separate subsidiary for its domestic services.

The staff recommended that AT&T be limited, at least initially, to using domestic satellite for non-competitive services (e.g. interstate message toll services). Also, if AT&T elected to lease satellite capacity from COMSAT, it would have to demonstrate that such an approach is no more costly than sharing jointly owned facilities with COMSAT, which neither has proposed, or acquiring facilities by other means.

As for other applicants, the staff recommendation said its "proposal would permit applicants who have proposed use of the same or similar types of satellite technology to share ownership and use of a single satellite," presumably in some consortium arrangement.

Still another possible category was suggested for those applicants who have proposed advanced-technology systems. The FCC press statement said: "Those proposing novel technology, for example, MCI-Lockheed and Fairchild, would have an opportunity to demonstrate the asserted advantages in independent space segments."

Bernard Strassburg, Chief, Com-

mon Carrier Bureau, briefed the press on the staff recommendation when it was made public. Strassburg was quoted as characterizing the recommendations this way: "This is a 'get started' program."

The proposed Report and Order merely was a staff recommendation. Much remained to be completed before a final policy could be issued by the Commission. Parties in the case were given the opportunity to file written comments, if they desired by April 19, followed by oral arguments May 1.

Whatever course eventually is adopted, however, COMSAT fully expects to have a significant part in the provision of domestic satellite services.

The staff reported differed to some extent from the "open skies" policy recommended by the White House in January 1970 under which anyone with the financial and technical qualifications would be permitted to provide domestic satellite services.

Following that White House policy statement, the FCC in March 1970 called for filings. COMSAT was among eight major applicants whose filings now are pending before the Commission. They include: COMSAT jointly with AT&T and with a separate multipurpose system, Hughes-General Telephone, MCI-Lockheed, RCA Globcom, Fairchild, Western Telecommunications and Western Union.

Prior to 1970, the domestic satellite issue had a long and stormy history. COMSAT submitted major and detailed applications in 1966 and three times in 1967, and also submitted many other documents and comments in reply to specific inquiries in the past by the Commission and others. But each time, action was postponed.

Two major Presidential study groups have reviewed the issues. Once, under former President Johnson, the so-called (Eugene) Rostow group recommended that COMSAT be given the job as trustee to go ahead with a pilot domestic satellite program. Later, under President Nixon, a group headed by Clay T. Whitehead, now Director of the Office of Telecommunications Policy (OTP), issued the "open skies" policy of January 1970.



Antarctic tests succeed, regular service begins

By DAVID W. LIPKE

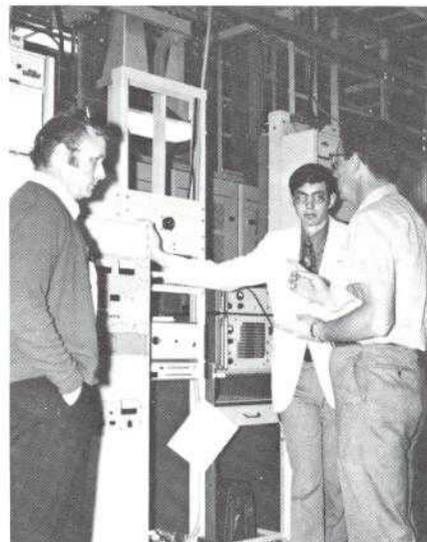
For more than a decade, the National Science Foundation (NSF) has supported a wide variety of Antarctic research programs designed to collect data for scientific studies. One of the more difficult and costly aspects of these programs has been the necessity of maintaining manned stations where much of the Antarctic research is conducted.

To decrease the cost and complexity of these operations NSF has developed a prototype unmanned automatic station to augment its present network of manned stations. This prototype station was built by Stanford University under contract to NSF and is now in service at McMurdo Station on Ross Island in the Antarctic.

■ *Mr. Lipke is manager, special projects, on the Headquarters Technical Staff.*

The station is designed to transmit scientific information through a geostationary satellite to the U.S. Mainland where the data can be reduced for analysis. By means of remote commands relayed through the satellite, signal parameters at the unattended station can be changed to fit the requirements of the experiments.

In order to verify the feasibility of such a concept, the ICSC recently approved the use of the INTELSAT



system for a month of experimental tests and evaluation of the communications links. Prior to shipment of the equipment to Antarctica, the electronics was tested at COMSAT's L'Enfant Plaza station to assure proper operation. These tests were conducted under the supervision of Technical's special projects office, which is responsible for the technical aspects of the satellite use.

Additional testing of both the data communications link and the remote command link via the Jamesburg Earth Station and a Pacific INTEL-SAT satellite was conducted during January. These tests proved very successful and as a result commercial service was initiated between Antarctica and Jamesburg on February 14.

The National Science Foundation will continue this service through November of this year in order to gain long-term experience with the operation of an unattended station.

This project is the first extended test of an unattended earth station operating through an INTELSAT satellite and could serve as a forerunner for a number of future satellite services. If this prototype station proves successful, the National Science Foundation anticipates that as many as 10 such stations could be used in Antarctica thus reducing the cost and hazard of collecting scientific data.

Dr. Michael J. Olson of Stanford University confers with Jamesburg's assistant station manager, Michael J. Downey (left), and electronics engineer Jack H. Inman on a transmission test from the Antarctic.

New technique promises to double TV capacity

BY LEONARD GOLDING

Most people associate satellite communications with the color televising of spectacular news and sporting events such as the recent winter Olympics from Japan or President Nixon's visit to China. While television is actually only a small percentage of the total satellite traffic, television signals require a capacity equal to 600 to 900 telephone channels. Frequency modulation (FM) is the current method used for transmitting color video signals, with the accompanying audio transmitted on separate carriers within the same transponder.

DITEC's objective is to develop a new transmission method which will double the TV capacity of an INTELSAT IV satellite. This goal is achieved by converting the television signal into a stream of binary numbers (analog-to-digital conversion).

In order to produce a color picture it is necessary to transmit three separate signals. The signal which conveys most of the detail in the picture is the black and white (or luminance) signal, which is, of course, the only signal seen on a black and white receiver. The luminance signal has a 4.2 MHz bandwidth. The color information is

■ *Dr. Golding is branch manager of TV and communications analysis, Communications Processing Lab.*



Figure 1. Too few bits per sample produce artificial contours.

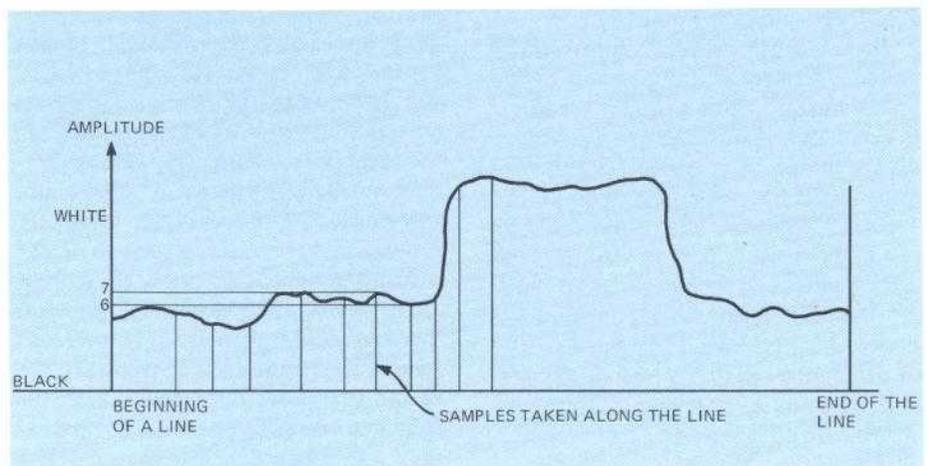


Figure 2. Illustration of video signal for one line.

carried by two other signals, known as the I and Q signals. These signals determine the "pure" color (such as red, green, yellow) and the amount of mixing with white. The I signal has a 1.5 MHz bandwidth, and the Q signal only a 0.5 MHz bandwidth. Thus the color signals have a resolution 1/3 and 1/9 that of the luminance signal and convey much less detail.

The television signal obtained at home or received at an earth station, called a composite signal, contains all three signals combined into a 4.2 MHz bandwidth.

In current FM television systems the composite television signal is directly modulated on a carrier wave. In the DITEC system, the composite signal is first separated into luminance and color signals. The three signals (luminance, I and Q) are separately encoded into digital form.

In the conversion process, use is made of the fact that for most of the picture very little change occurs from sample to sample along a line, from line to line within a single frame, and from frame to frame. This fact allows a lower sampling rate for each of the three signals and fewer bits per sample reducing the required number of bits per sample from eight to five, and the required sampling rate from ten to six MHz. In order to represent those portions of the picture which change rapidly, such as across an edge or contour, the conversion process is made adaptive; that is, when the video signal undergoes a rapid change the conversion process is altered to represent large changes in the signal.

In an FM system "noise" (unwanted signals) is independent of the video signal, but in a digital system it is not. As a result, the characteristics of the noise in a digital system are quite different. For example, Figure 1 shows a picture where too few bits per sample were used to describe the gray scale, producing artificial contours in the picture. This dependence between signal and noise can be used to advantage to make the noise less noticeable to an observer.

Approximately 18 percent of a TV video frame is used to transmit syn-

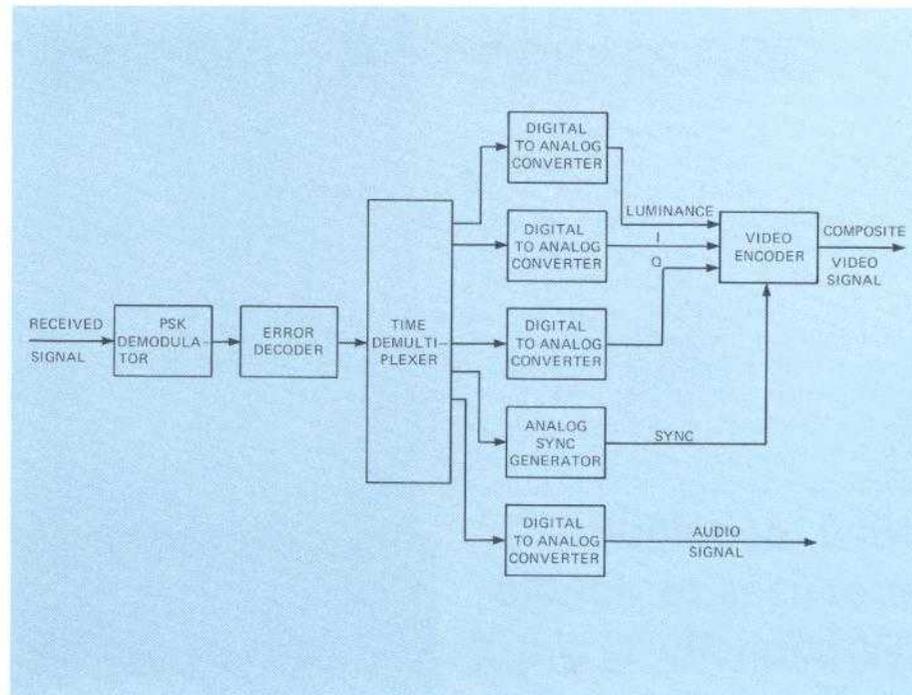


Figure 3. DITEC receiver block diagram

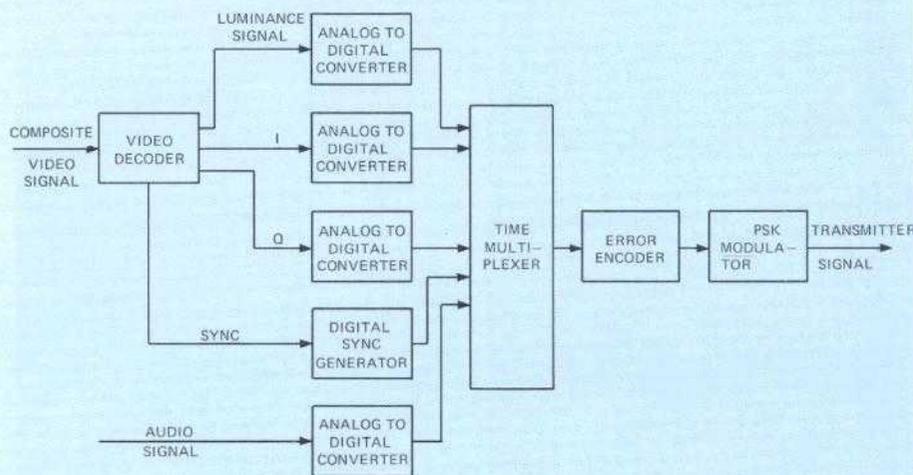
chronization information: identification of the beginning of each line and the beginning of the top of the picture. In the DITEC system the conventional synchronization signals are replaced by digital signals, which occupy only a small fraction of the 18 percent allocated for this purpose. The remainder is used to carry the audio program channel and up to 30 telephone channels, thus eliminating the need for a separate audio carrier as in FM.

In coding each of the video signals, advantage is taken of the fact that the change from sample to sample along a line is generally quite small. This is illustrated in Figure 2, where the vertical lines represent samples taken along a line in the picture. In PCM the amplitude of the samples is transmitted as a binary number. In the DITEC system only the differences between sample values are transmitted. For example, in Figure 2, one sample value is shown to be seven followed by another with a value of six. The difference between the two values, of course, is one, and "one" is transmitted instead of the actual sample values. The reason for transmitting difference values is that they will always be close to zero if the video signal does not change much from sample to sample and thus have

a smaller dynamic range. This reduced dynamic range permits accurate encoding of the signal with fewer bits per sample. However, as shown in Figure 2, when a rapid change occurs in the video signal the difference value can be quite large. In the DITEC system, when large difference values are detected, the difference value is re-coded using a coding scheme designed for large differences.

The video, audio and synchronization information are time-multiplexed or sequenced together to form a series of binary numbers. As a result of system noise, errors can be made in interpreting the sequence of numbers at the receiver. To reduce these bit errors to a point where they are no longer perceptible, error coding is employed. The error code reduced the occurrence of bit errors from one every 2000 bits to one every 100 million bits, providing a savings in transmitted power of approximately four decibels.

In the receiver (Figure 3) the operations complementary to those of the transmitter are carried out. The digital video and audio signals are converted back to analog form, the analog synchronization signals are regenerated and the composite video signal reformed.



and DITEC transmitter block diagram.

When compared to conventional FM transmission, the DITEC system can offer substantial savings in power and bandwidth. In addition, the use of digital transmission will have other benefits. Some of these are:

- Interference between satellite and ground communication links will be reduced,
- The system is compatible with TDMA (Time Division Multiple Access) as well as FDMA (Frequency Division Multiple Access) techniques,
- Distortion in the satellite transponder can be dealt with more effectively,
- Standards conversion can be carried out with less degradation, and
- Compatibility with terrestrial digital switching systems.

The greater efficiency of the digital transmission system also makes it attractive for increasing capacity over terrestrial microwave relays; where in the past one television signal was carried over a 20 megahertz radio relay link, two channels could be provided using the DITEC system. In addition, the reduced power requirement of

DITEC would lead to the use of smaller earth stations, which could receive a full-quality color television signal.

These applications, a direct result of the greater efficiency of the digital transmission system, as well as the above reasons indicate that systems such as DITEC appear attractive as a future means of television transmission.

Revenues up, net income of \$2.25 per share reported

COMSAT recently reported that net income for 1971 increased to \$22,537,000 or \$2.25 per share, compared to \$17,501,000 or \$1.75 per share for 1970.

Revenues for 1971 amounted to \$88,385,000, an increase of 27 percent over the \$69,598,000 in 1970. The increase resulted from continuing growth in the use of the global satellite system. At December 31, 1971, COMSAT was leasing 2537 full-time half circuits. This represents a gain during 1971 of 515, or approximately 26 percent, in full-time commercial half circuits.

Partially offsetting this gain was the termination by the National Aero-

navics and Space Administration of 117 equivalent half circuits for Project Apollo communications via a NASA shipboard antenna in the Atlantic Ocean. Thus, the net gain during the year was 398 half circuits, an increase of approximately 19 percent over the 2139 half circuits being leased at the end of 1970.

Operating expenses for 1971, including income taxes of \$17,320,000, totaled \$71,966,000, an increase of 22 percent over the 1970 operating expenses of \$59,118,000 which included income taxes of \$11,423,000.

Net operating income for 1971 was \$16,419,000, compared to \$10,480,000 for 1970.

New IV satellites expand service in two oceans

The space segment of the global system was greatly expanded early this year when the second and third INTELSAT IV satellites began commercial service in the Atlantic and Pacific Oceans.

In the Atlantic basin, two IVs are now in full operation. When the second of these went into service on February 19 some 700 full-time circuits were transferred in a matter of minutes from the Atlantic INTELSAT III.

The Atlantic IVs are presently stationed, respectively, at 24.5° West longitude and 29.4° West longitude.

In addition to the two Atlantic IVs, another INTELSAT IV is now in service over the Pacific Ocean. All Pacific area satellite traffic, involving some 850 circuits, was transferred in a mass transition to this new satellite on February 14.

An INTELSAT III satellite, which had provided Pacific area service since February 1969 and recently relayed color TV coverage of the Winter Olympic Games from Sapporo, Japan, relinquished its circuits to the IV. The INTELSAT III remains in orbit as an alternate facility.

Both the Pacific IV and the Pacific III are stationed 22,300 miles above the equator near the Gilbert Islands over the mid-Pacific.

On my mark . . . T minus 60 seconds

BY LARRY G. HASTINGS

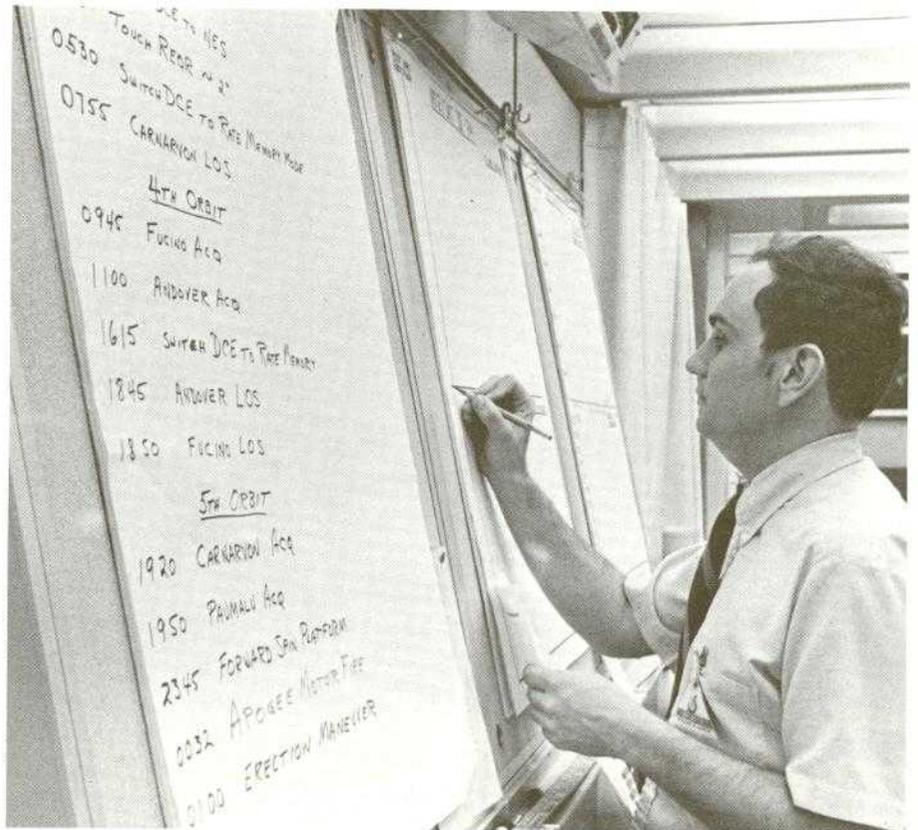
The process of thrusting an INTELSAT satellite from its elliptical transfer orbit into a circular or synchronous orbit involves a wait but not the extended kind which can be experienced in the launch process.

Apogee motor firings follow operational plans, plans that due to orbital mechanics allow little deviation.

By the nature of the restrictions placed upon an apogee motor firing, waits are for the most part predictable. Apogee motor firings must follow operational plans—plans that due to orbital mechanics allow little deviation.

The most recent launch (INTELSAT IV, F-4) took place on Saturday, January 22, 1972, at 8 p.m. EST, from Pad 36B at Cape Kennedy, Florida. Mission plans included options for its apogee motor to be fired at third or at fifth apogee over the Pacific Ocean.

■ *Mr. Hastings is a COMSAT senior information officer.*



Space segment implementation staff member Wally Gribbin plots spacecraft performance perimeters.

PHOTOS BY ALLAN GALFUND

After a satellite is launched, its transfer orbit is highly elliptical, much like the shape of an elongated egg. Its closest point to earth (perigee) is about 300 statute miles and at the opposite end of the orbit, its farthest point from earth (apogee) is approximately 23,000 statute miles. Because of the tremendous distances involved, each orbit around the earth requires about eleven hours. The first apogee, because the spacecraft does not have to travel a full orbit, is reached in half the time, or 5½ hours. To reach each apogee thereafter requires an additional eleven hours per orbit. Based upon the time of launch of the IV, F-4, the third apogee would be reached at 10:30 p.m. EST, Sunday, February 23, and fifth apogee at 8:30 p.m. EST, February 24.

During this waiting period, additional tracking and telemetry data were refined by COMSAT's engineers at the Spacecraft Technical Control Center, through the use of computers. The satellite was reoriented, or pinpointed in the proper direction, so that when its apogee rocket motor

was fired, the thrust would push it out into the desired synchronous equatorial orbit.

In the sequence of events leading up to the ultimate launch of the rocket, decisions are made at the Mission Director's Center at Cape Kennedy, Florida, by Martin J. Votaw, Assistant Vice President and Director of the Space Segment Implementation Division, and his team. Once the satellite is successfully placed in transfer orbit, control of the mission is shifted to the Spacecraft Technical Control Center in the COMSAT building in Washington, D. C.

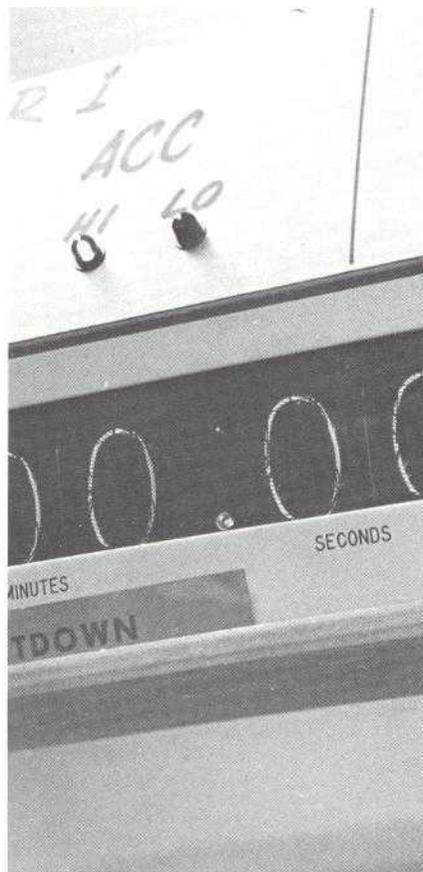
The Control Center becomes the nerve center for the satellite, receiving reports from four INTELSAT TT&C (Tracking, Telemetry and Control) stations. In the network of earth stations, there are four TT&C stations: Paumalu, Hawaii; Carnarvon, Australia; Andover, Maine, and Fucino, Italy. Carnarvon would transmit the apogee motor firing command to INTELSAT IV, F-4. It is in Washington where the decisions are made and from where execution commands are given to the earth sta-



A. A. Satterlee, manager, celestial mechanics, reviews his last-minute calculations with staff members Carol Smith (left) and Vera Wilson.



John Tull, space segment implementation staff member, monitors the strip chart recorders.



All eyes watch the count-down clock.

enough? Someone says "34.6 seconds, a little longer than normal." It turns out that the additional seconds were a read-out delay and the burn was indeed normal.

Dr. Charyk and Mr. Votaw confer together quietly as the accelerometer-rotation print-out pen swings in broad strokes from right to left, leaving bold, black zig-zag marks on the chart. Gradually, the satellite speed increases to normal, the damper does its job and the black squiggles narrow to a solid, straight line. People in the center nod and speak quietly to each other. Looks good, but no one allows himself the full satisfaction of a congratulatory exclamation just yet. Within a few minutes, all necessary data on burn, attitude and spacecraft performance will be in.

Then, and only then, will it be a hard fact. Arnold Satterlee and his team of mathematicians huddle around a table, going over figures and graphs. Little conferences still go on.

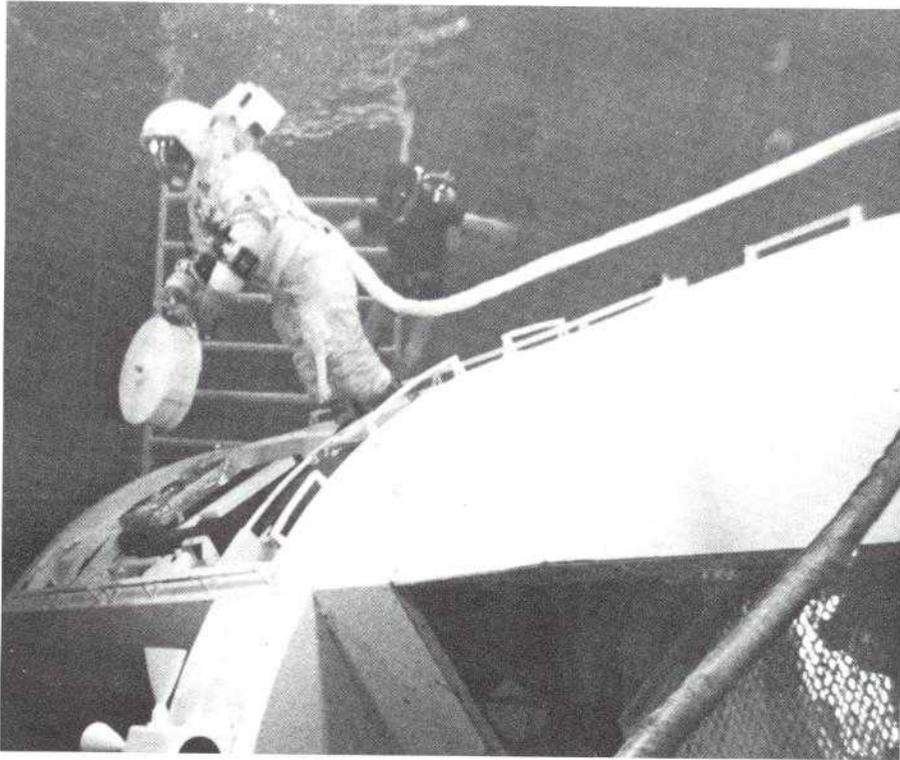
This then is it. F-4 is in circular orbit. Now people congratulate each other.

Finally, Dr. Charyk and Marty Votaw lean back in their chairs, smile at each other and take off their head sets. Harold Rosen shakes hands with both of them.

This then is it. F-4 is in synchronous orbit. Now people congratulate each other, shaking hands. Public information officers huddle with Dr. Charyk and Marty Votaw, making last minute modifications to the press releases which will announce "the successful emplacement in orbit of a new INTELSAT IV communications satellite."

Another INTELSAT IV. But this one had a special, history-making assignment. INTELSAT IV, F-4, 22,300 miles above the Pacific Ocean at the equator, brought live coverage of President Nixon's epic voyage to China. Its first commercial transmissions of television were scenes showing the President in Peking.

INTELSAT IV, F-4, was to become the eyes and the ears of the world for this, a milestone in the march of history.



Command Module Pilot Thomas K. Mattingly practices walking in space in the water tank facility at the Houston Manned Spacecraft Center as he prepares for his task of retrieving film during the return journey of Apollo 16.

Apollo 16 mission to use new IV satellites

BY JOHN J. PETERSON

During the flight of Apollo 16, the new INTELSAT IV satellites will provide NASA communications support and TV network transmissions over the Atlantic and Pacific Oceans.

The Pacific INTELSAT IV, put into service only in February of this year, will carry an history-making event to a worldwide audience. Following the Sunday, April 16, liftoff at 12:54 p.m. and translunar flight, Astronauts John W. Young and Charles M. Duke will spend more than three days on the moon and more than 21 hours exploring its rugged surface. Some 20 hours of their lunar travels will be televised back to earth and will become available for worldwide distribution over the global system of satellites and earth stations.

■ *Mr. Peterson is a COMSAT information officer.*

In addition to liftoff and splashdown, two critical phases of the mission will be carried over the communications satellite system to the Houston Manned Spacecraft Center for further worldwide release "via satellite." The liftoff of the lunar module carrying Astronauts Young and Duke from the surface of the moon will be photographed by a camera mounted on the lunar rover, as well as the film recovery by Astronaut Thomas K. Mattingly, working in space, almost 200,000 miles from earth and traveling at 2500 miles per hour.

As during previous Apollo flights, the global system will play an important role in the NASA communications network as it brings news of the lunar flight to millions of people throughout the world.

Apollo 16 will be the first manned mission to use INTELSAT IV satellites in both the Atlantic and Pacific Oceans. Both voice and data transmissions and live televised crew activities will be carried over the NASA communications network utilizing these satellites and COMSAT-operated earth stations, to the Manned Spacecraft Center in Houston, Texas.

Voice and data communications between the Apollo spacecraft and Houston Mission Control will be relayed through the Goddard Space Flight Center, NASCOM Switching Center, in Greenbelt, Maryland.

Over the Atlantic Ocean, three alternate routes are available for voice and data transmissions through Goddard to Houston via the INTELSAT IVs: from the Spanish earth station in Buitrago to the COMSAT-operated earth station at Etam, W. Va.; from the United Kingdom's Ascension Island earth station to the COMSAT-operated earth station at Andover, Maine; and from the NASA Tracking ship Vanguard to the COMSAT-operated earth station at Andover.

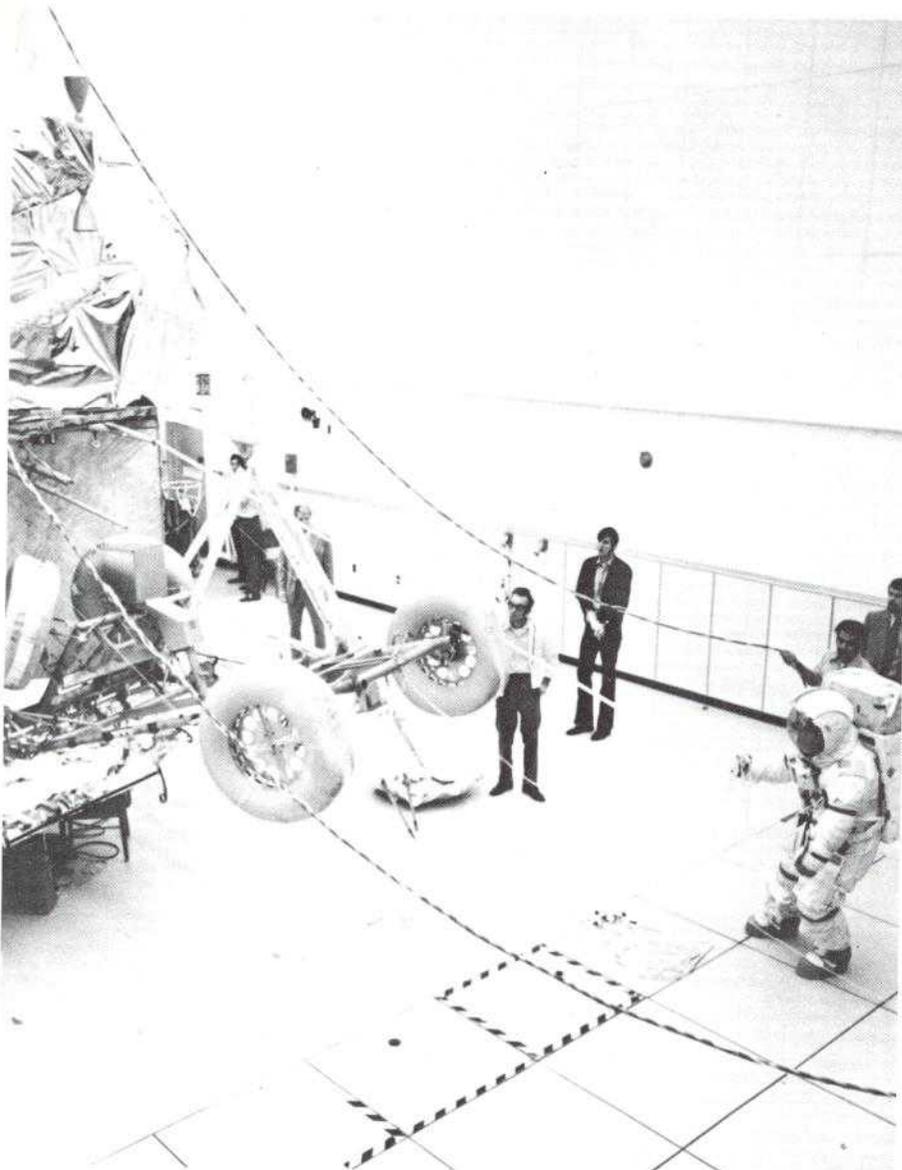
Voice and data transmissions using the Pacific INTELSAT IV will be transmitted to Goddard and Houston from the Australian earth station at Moree via the COMSAT-operated earth station at Jamesburg, Calif.

According to preliminary scheduling, the INTELSAT IVs will provide a link in the communications chain which will televise the liftoff of the lunar module from the surface of the moon and the transearth EVA (extra-vehicular activity) transfer of film from lunar module to the command and service module.

Television transmission will be in color with both the CM and LM carrying color TV cameras with an additional black and white camera in the LM. Transmissions from the spacecraft will be sent to Houston by way of the NASA Apollo tracking station at Goldstone, Calif., and through Spain to Etam via an Atlantic INTELSAT IV. Live transmissions from the lunar surface will follow similar routes.

Telecasts of the Apollo 16 liftoff will be transmitted separately for commercial national distribution by the major American networks, and by the networks and an international television pool from Cape Kennedy to the TV pool outlet in New York City for further distribution in the United States and overseas.

The Pacific Ocean splashdown transmission will originate aboard the aircraft carrier U.S.S. Ticonderoga for relay via the Pacific INTELSAT IV satellite to the COMSAT-operated



Astronaut John W. Young, Apollo 16 commander, rehearses deployment of the Lunar Rover Vehicle from the Lunar Module storage bay at Cape Kennedy.

earth station at Jamesburg, Calif. and then on to the TV network pool in New York City.

Overseas telecasts of mission events will be transmitted by terrestrial facilities from the New York TV pool outlet to Etam and then over the Atlantic INTELSAT IV to North and South America, Europe, Africa and the Middle East.

The European Broadcasting Union (EBU) will make distribution in the Western European countries and has an interconnecting capability with Intervention to the Soviet Union and the Eastern European countries.

Live televised events of Apollo 16 will be received by earth stations in

Australia, Alaska and Hawaii via the Pacific INTELSAT IV from Jamesburg, Calif. Middle Eastern countries will receive televised events from the Indian Ocean INTELSAT III via a double-hop, by way of the Atlantic or Pacific Ocean INTELSAT IVs.

Following the splashdown of Apollo 16, additional TV transmissions are expected to be received from the lunar rover-mounted TV camera for six successive days. Fifteen-minute transmissions will be received April 29 at 6 a.m., April 30 at 7 a.m., May 1 at 7 a.m., May 2 at 7 a.m., and May 3 at 7 a.m. On May 4, there will be a 30-minute transmission beginning at 9:45 a.m.

Voice of INTELSAT at Cape Kennedy gets Houston post

John W. "Jack" King, NASA's Chief of Public Information for the past 11 years at Cape Kennedy, formerly Cape Canaveral, has been named Director of Public Affairs for the NASA Manned Spacecraft Center, Houston, Texas.

King, 40, has been the "Voice of INTELSAT" during the past 15 INTELSAT launches, providing narration for the pre-launch countdowns. During his years at the Florida space center, he has participated in more than 200 launches, including Apollo, Gemini and Mercury.

He was awarded NASA's Exceptional Service Medal in 1969 in recognition of his participation in Project Apollo and the same year was honored with the Lawrence Award of the Aerospace Writers Association as the outstanding civilian public information officer in government.

A graduate of Boston College, he first covered space and missile activities at the Cape for the Associated Press. Prior to that assignment, King was an AP reporter in his home town, Boston. During the Korean conflict, he served in combat as an artillery officer. During his stay in Cocoa Beach, he has been active in civic functions, Little League and church groups.

Mr. King



Highlights of ICSC actions at 57th meeting

The 57th meeting of the Interim Communications Satellite Committee was held from February 23 to March 1, 1972, in Washington, D. C. Eighteen members, representing a total of 48 of the 83 signatories, were present at the meeting.

Among its actions, the Committee:

- Authorized COMSAT as Manager to negotiate with and award a contract to Lockheed Aircraft Corporation for an early version INTEL-SAT V design study for \$250,000.
- Authorized the positioning of the INTELSAT IV, F-3 (launched February 19, 1972) at 330.5 degrees East longitude as the second operational Atlantic satellite.
- Authorized the repositioning of the INTELSAT III, F-6 to the Indian Ocean region to serve as an emergency replacement for the INTEL-SAT III, F-3 and the relocation of the INTELSAT III, F-4 to the same region if the operation of the INTEL-SAT III, F-3 and the INTELSAT III, F-6 should appear to be unsatisfactory.
- Agreed to maintain those provisional space segment charges previously agreed to, for transmission to and from a small unmanned Antarctic earth station operated by the National Science Foundation pending a further recommendation by the Advisory Subcommittee on Finance at the June meeting of the Committee.
- Amended the current policy concerning the free use of the INTELSAT space segment for experiments and demonstrations to provide that entities authorized to participate in experiments or demonstrations will not incur any liability to INTELSAT for any loss or damage to an INTELSAT satellite.
- Adopted the INTELSAT budget for 1972, as recommended by the Advisory Subcommittee on Finance and as previously proposed by COM-SAT as Manager.
- Established in response to in-

quiries from the representatives of Spain and Mexico a minimum period for the allotment of a full-time TV channel of not less than one year, a period of notice of termination after expiration of the first year of 30 days and a charge for the cancellation of a reservation of a full-time TV channel equal to $\frac{1}{3}$ of the total three-month space segment charge which would be payable in the event notice of cancellation is given less than one month prior to the scheduled date of service.

- Approved the application submitted by RCA Global Communications, Inc. on behalf of the Peking Bureau of Long Distance Telecommunications, for access on a temporary basis, to the Pacific III or IV satellites by a non-standard earth station to be located in Shanghai, People's Republic of China.

- Instructed COMSAT as Manager to suspend further discussions with the European Space Research Organization (ESRO) regarding collaboration on a possible experimental satellite program until the 59th meeting beginning June 21.

- Granted a request from Hughes Aircraft Company to use INTELSAT IV foreground data, royalty free, in performance of a contract with RCA Limited of Canada.

- Granted initial approval to the Goonhilly 3 (U.K.) and Lessive (Belgium) standard earth stations for access to INTELSAT III and IV satellites. The committee also granted formal approval to the following stations to operate with the INTELSAT III satellites: Andover (U.S.A.); Prospect Pen (Jamaica); Baqa (Jordan) and Tanum (Sweden).

- Authorized COMSAT as Manager to execute an amendment of the existing agreement with the Smithsonian Institution, under which the INTELSAT II, F-5 will be exhibited pursuant to the same terms and conditions which apply to the exhibition of INTELSAT I, F-2.

- Noted the accession of Barbados with a quota of 0.05 percent, bringing INTELSAT membership to 83.

- Scheduled the 59th meeting of the Committee to begin on June 21, in Stavanger, Norway.

George Lawler, our man in Peking

By GEORGE A. LAWLER

A U.S. Air Force C-141 cargo plane commanded by a 28-year-old Air Force pilot in civilian clothes made a perfect landing at the Shanghai International Airport. The time was 10:31 a.m., February 1, 1972. It was the first U.S. military aircraft to land in Shanghai in over 25 years.

Aboard were protocol personnel, White House communications specialists, Secret Service agents, one COMSAT representative and tons of communications equipment. One hour later, a chartered TWA 707 with TV technicians, ground station personnel and a myriad of television studio equipment landed. This was the final advance party for President Nixon's visit which would begin 21 days later. Several other advance parties had preceded us to plan and negotiate arrangements with the People's Republic of China (PRC). General Sampson, COMSAT Vice President-Operations, had assisted the U.S. Government in making arrangements for use of the Pacific satellite during his 10-day visit in January.

After a greeting by Shanghai officials and an excellent Chinese lunch

The hotel was very comfortable, with a plentitude of jasmine tea, cigarettes, toothpaste.

at the airport restaurant, we boarded our plane for the last leg—a two hour flight to Peking. Joining us for this last hop were Chinese protocol officials and a Chinese navigator.

We landed in Peking in minus 10 degree weather, received warm greetings from numerous PRC officials and were driven 19 miles to the 10-

■ Mr. Lawler is Director of Marketing in Operations.



George Lawler and friends.

story Nationalities Hotel in Peking. The drive was most impressive; the roads and streets were immaculate. The President of Pakistan had arrived for a state visit two hours earlier, and there were numerous banners, flags and signs welcoming him in Chinese and English.

The hotel was very comfortable. There was a plentiful supply of jasmine tea, fruit and cigarettes in the room, as well as a shining array of toothpaste, tooth brushes and other toilet articles. The service by the 14 attendants assigned to each floor was equal to or better than any I have had anywhere in the world.

Within an hour after arrival, we were meeting with our Chinese counterparts on procedural and technical matters relating to the earth station installation and use of the satellite. The Chinese had prepared very well for the installation. They had erected two buildings at the airport—a 10,000 square foot building for the television

production center and a smaller 2,000 square foot building as a communications technical center. Both buildings were erected within 30 days and were of excellent construction.

Since General Sampson's visit three weeks earlier, a 50-pair cable between the airport and the Cultural Palace in Peking (19 miles) had been installed underground.

On February 2, the Hughes ground terminal arrived. With the help of Chinese technicians, it was installed and ready for operation within three days, providing a communications capability of 60 two-way voice circuits plus a color TV transmit channel—a greater capacity than the first transatlantic telephone cable between the United States and Europe installed only 15 years ago. (One can't help but wonder what the next 15 years will bring in communications technology.)

The visit was not all work. The PRC had arranged tours to the Great Wall, the Ming tombs, a commune, the Forbidden City, and many other points of interest. To me, the most impressive tour was to the Peoples No. 3 Hospital to witness major operations on four patients, using acupuncture anesthesia. The four patients were in adjacent operating rooms, and we were allowed to move about as we desired, taking pictures, talking to the patients and asking questions of the doctors. One of the doctors, a woman, had studied medicine in Brooklyn and Johns Hopkins. Operations performed were a Caesarean Section, removal of a goiter, lung

The Chinese seemed hard-working, honest, capable, devoted to Mao.

operation and hernia operation; all were successfully performed with acupuncture anesthesia.

The press and television newsmen arrived on Sunday, February 20 and were quartered in the Nationalities Hotel. The President and his party arrived Monday the 21st, and by no means could you call his welcome really enthusiastic.

At the banquet that night in the Great Hall of the People, hosted by Chou En-lai, things took a turn for

the better. He praised the American people, and his entire toast was one of peace and friendship. In a surprise move later in the day, President Nixon called on Chairman Mao for one hour. The next day, the Peoples Daily carried pictures and stories of the President's arrival and meeting with Chairman Mao. One could detect a change in the atmosphere after that among the Chinese.

Space precludes a discussion of the two state banquets, the gymnastic exhibition, church services and my talks with the various Chinese people; but one impression remains uppermost in my mind—the Chinese are hard working, honest, capable and seemed completely devoted to Mao and his teachings. They appeared to be well clothed, well fed and well housed.

It does seem a shame, however, that the fantastic satellite communications capability from Peking via an INTELSAT IV and COMSAT's earth station at Jamesburg, Calif. which existed during the President's visit was discontinued six hours after his departure. However, the Shanghai station remains in service, establishing a permanent satellite communications link in China.

Communications was the name of the game

By FAY GILLIS WELLS

Communications was the name of the game on President Nixon's imaginative Journey for Peace behind the Bamboo Curtain.

Thanks to the miracle of the fabulous, new INTELSAT IV satellite, the world had loge seats to the television spectacular of the decade as it actually was happening—the first visit ever of an American President to Mainland China.

It was a communications coup that boggles the orderly mind. The peoples of China and the United States have been isolated from each other for over 20 years; then, within

■ Mrs. Wells is White House correspondent for the Storer Broadcasting Company.



Mrs. Wells visits the Great Wall.

six months, they combined their ingenuity, electronic talents and their translators to set up a sophisticated communications system that covered the major meetings between the leaders of the People's Republic of China and President and Mrs. Nixon during their week-long visit to Peking, Hangchow and Shanghai. Its successful accomplishment was compounded by the complicated language barriers and the diametrically opposed ideologies of the capitalists and the communists.

The invasion of the American news media was a traumatic experience for the Chinese. To permit uncensored news coverage was a shattering decision for the Chinese. It meant relinquishing control of their news to their worst enemies. But their fears proved foundless and the live coverage turned out to be a pictorial plus for both sides.

The major networks were permitted to build studios at the Peking Airport to edit, develop and transmit programs. Here the stables of network

stars did their live shows to supplement their on-the-scene reporting.

The news center at the Palace of the Nationalities, in town, was an elaborate facility set up for the convenience of the White House news media. A network pool studio was set up in one corner for audio feeds. In contrast to the generally austere surroundings, it had a backdrop of a priceless, handcarved screen, with a magnificent mother of pearl and jade peacock dominating the scene. There were rows and rows of tables and chairs for the reporters—but no typewriters—the local typewriters had the wrong keyboards. There were a series of broadcasting booths for the independent group stations who paid approximately \$25,000 each for their shares of the satellite costs. There were 15 long distance phone booths, regulated by the telephone center, and manned by very efficient operators. There was a battery of telex machines in the basement to handle the copy of the writing press. And attendants were on call at all hours to bring refreshing cups of piping hot green tea. A most impressive layout, that seemed to work better for the voicers than the writers. The telephone operators could deal with one small telephone number; the telex operators were inundated with copy. The facilities in Hangchow and Shanghai were not as elaborate as Peking, but they were equally efficient.

But there were other types of communications, as well. The communication between the Americans and their interpreters. Mine was nice, most helpful, but skilled in replying with a well-turned answer that had nothing to do with the question. She assured me America and the PRC could be friends as soon as we settled the Taiwan question. She wouldn't be interviewed on tape, saying she was not qualified to interpret the teachings of Chairman Mao. She knew long before the White House press informed us, what our schedule would be, knew exactly what bus I was assigned to and where I was supposed to stand. She is married to man who works in her office—she was reluctant to tell me his name without his permission. Their eleven-year old daughter “goes to school and is quite capable

of taking care of herself.” She admits she is a terrible cook and doesn't like housework.

There was the delightful communication between the White House group and their room attendants. There were bowls of tangerines and candy in every room that were replenished every day. There were thermoses of boiling water for tea made in those delightful covered teacups. The instant repair service of torn-off buttons or ripped pockets was a continual source of joy, particularly to the male members of the press. Shoes left outside the door were shined during the night; items forgotten in hotel rooms were forwarded to the next town. There was absolutely no tipping.

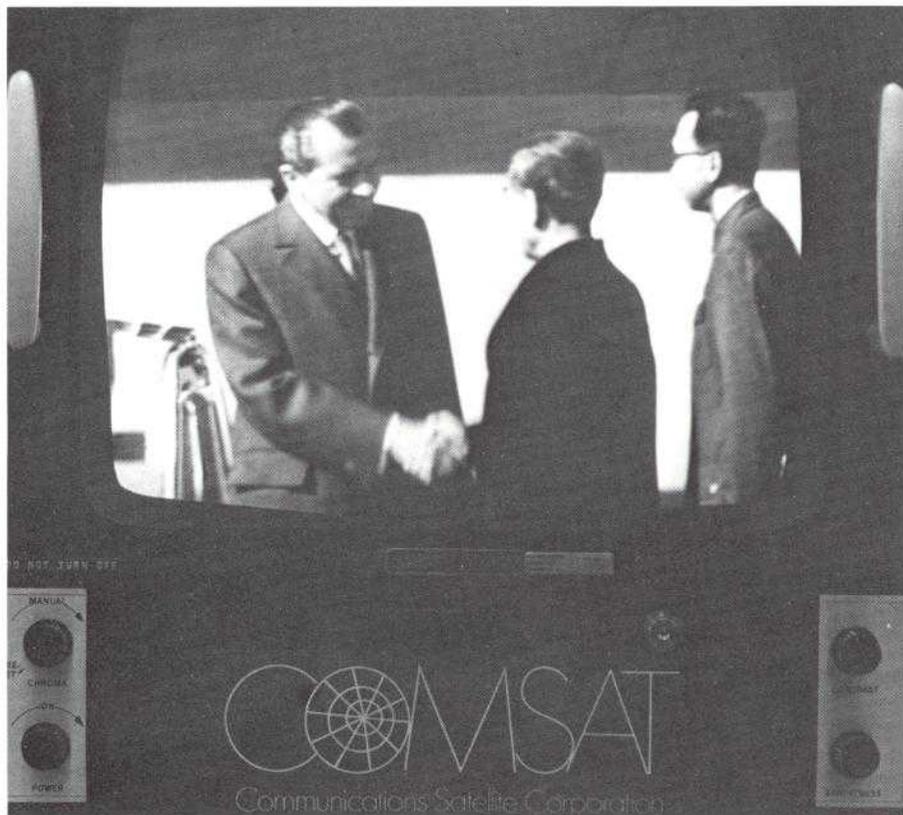
There was the thin, but tensile Red communication barrier between the correspondents and the people. Most reporters were frustrated by the lack of concrete answers to specific questions when they could find people who spoke English. But there was no doubt that the Chinese people all have studied Chairman Mao's Little Red Book, very well, indeed. There is a quotable Mao saying for every situation and most Chinese seemed to have learned the book by heart so they never were at loss for an answer. The Little Red Books are found in all public places and they are free so no one could plead ignorance because he couldn't afford one. It is published in many languages so Mao's sayings are quoted around the world.

But the minuses were offset by the pluses of satellite communications that enabled everyone to see and be seen as it was happening. Judging by the overwhelming reaction, the world wants more of this instant, on-the-spot communication between people and now that it has been proven feasible in the People's Republic of China, it can be done anywhere and probably will be, as the search for peace continues.

Via satellite

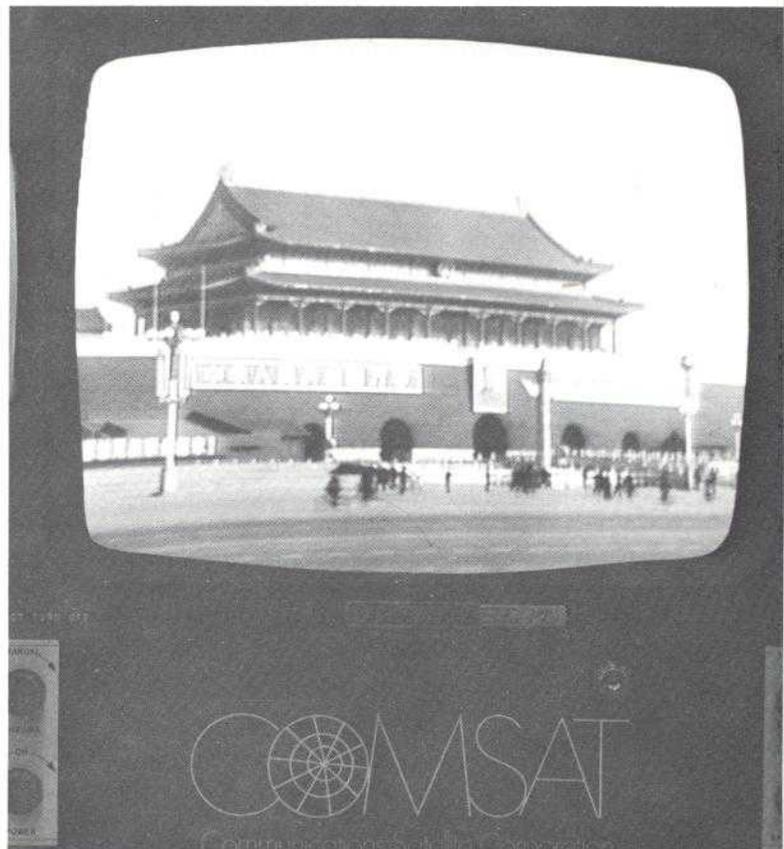
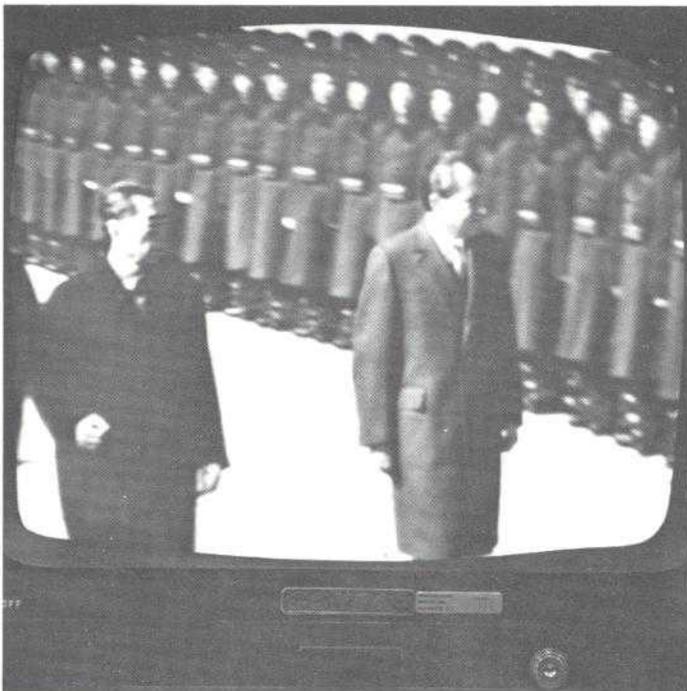
Events in Asia dominated the world news and helped make the 29 days of February 1972 a record month for TV broadcasters "via satellite." Broadcasters used approximately 190 half-channel hours of satellite time to chronicle in color President Nixon's eight-day journey through three cities in the People's Republic of China. The satellite link also provided telephone, teletype, photo and press message services for the trip, thus supplying the first real communications bridge between the U.S. and China in nearly 23 years.

Earlier in the month, broadcasters made heavy use of the satellite system for TV coverage of the Winter Olympics from Sapporo, Japan, accounting for 322 half-channel hours of satellite time from February 3 through February 13. The events pushed the total for the entire month of February to 753 half-channel hours, a record amount of time for telecasts via satellite in one month.



LIVE FROM
PEKING AIRPORT

AIR FORCE ONE



News coverage from China

By STEWART HENSLEY

It was 7:00 o'clock Sunday evening February 20 when I picked up a telephone in the press center in Peking and began dictating my first dispatch from China on the precedent-shattering visit of President Nixon.

It was a story to set the stage for the arrival in Peking of the President and his official party, which took place some 16 hours later. It took about 10 minutes for that first call to go through, a time lag which subsequently was greatly reduced as we persuaded the Chinese to short-circuit some of their traditional booking procedures.

The connection, through an earth satellite hovering more than 22,000 miles in stationary orbit over the Pacific, was so clear that the dictationist on the special China Desk in the Washington Bureau of United Press International had difficulty believing that I was actually in the capital of old Cathay behind the "bamboo curtain."

"My God," he muttered, his typewriter rattling like a machinegun in the background, "it's clearer than when you call in from the State Department."

At that point my mind suddenly flashed back to the time 38 years ago when, as a student at University of Missouri School of Journalism, I heard a great foreign correspondent say that the prime consideration for successful international reporting was to secure the fastest and most reliable communications with his headquarters.

The speaker was the late Webb Miler, then chief diplomatic correspondent for United Press, who was to die during World War II in a blackout accident in London.

His problems included creaky telegraph circuits, some subject to such exotic perils as rampaging elephants

in India, and limited capacity cables on which copy backed up badly when there were major news breaks.

I wondered what he would say could he experience the advantages of the incredible leap forward in communications made possible by the satellite system.

But my nostalgic flashback was brief, interrupted by demands for additional copy. Although it was only 6:00 o'clock Sunday morning in Washington—when virtually no American newspapers are on deadline—UPI's International Division, with thousands of clients located in every one of the 24 time zones around the world was on deadline everywhere and clamoring for all they could get via the automatic relays in New York and San Francisco.

The telephone circuit was "clearer than when you call in from the State Department."

Even in the U.S. at that unearthly hour the UPI Radio wire, which runs around the clock to more than 4500 broadcasting stations, was demanding material for the "wake-up" news shows.

When I had fulfilled those demands, the switchboard transferred me to UPI Audio which provides voice news and features broadcasts around the clock to more than 500 stations. I could see then that it was going to be a long week.

Meanwhile, UPI's photo chief, Bill Lyons, operating from a set-up in a hotel room across from the press center, was transmitting to New York pictures of such clarity that those on the receiving end described them as "fantastic" and of "incredibly high quality."

UPI and Associated Press had leased telephoto circuits through the satellite. Our circuits worked perfectly, providing instantaneous transmission of pictures of uniformly high quality, and I assume the AP had the same experience.

Our only disappointment, with regard to communications, was the failure of the news agencies to secure the "dedicated" 24-hour leased teleprinter circuits we had been given to under-



Mr. Hensley

stand would be available. This, however, was a bureaucratic failure and not due to any lack of facilities.

The White House, admittedly preoccupied with securing facilities for television, apparently assumed there would be no difficulty about leasing full-time teleprinter circuits. However, the Chinese, approached late on this point, did not understand just what was involved and balked at providing the required connections to the earth station.

UPI found, in test dispatches, that the time involved in transmitting individual press messages by the time-honored but outmoded system of handling them over the counter individually was too great to depend on that method.

We, therefore, depended almost entirely on the telephone circuits which provided an instantaneous transmission—but at more than double the cost for the week's transmissions over what would have been paid for a leased circuit controlled at both ends by UPI operators.

No blame should attach to the Chinese engineers and technicians, who were superb and made what must have been a tremendous effort in adapting to the strange ways of the American newsmen. They were unfailingly efficient and courteous. Any shortcomings were due to a lack of understanding between government representatives.

The substantive diplomatic and political results of Nixon's China trip may not become apparent for a long time. But the Presidential pilgrimage

■ Mr. Hensley is chief diplomatic correspondent for United Press International.

to Peking had one immediate and tangible result.

It catapulted China into the age of space communications and convinced Chinese authorities of the value of maintaining links with the rest of the world through this fascinating, fast and reliable medium.

The mobile earth station which transmitted television, radio and press coverage of the President's trip from its location at the Peking airport has been packed up and removed. This mobile station, built by Hughes Aircraft and under lease to Western Union International, is ready to go to the island of Guam for its next assignment—positioning and monitoring a Canadian communications satellite to be stationed over the North Pacific later this year.

However, the Chinese government has purchased and is operating on its own, entirely with Chinese personnel, a permanent ground station in Shanghai. It was built in 30 days by Globecom, a subsidiary of RCA, from electronic components flown in from Guam where they had been stored after dismantling of an installation in Thailand. It is equipped with a dish antenna 33-feet in diameter which was flown to Shanghai from Dallas in a Super-Guppy Hercules cargo plane, one of the few aircraft capable of accommodating its breadth.

News photos via satellite were of "incredibly high quality."

Against heavy odds, the station was completed in time to transmit television coverage of the President's activities in Hangchow and Shanghai directly to the United States.

This provided far quicker coverage than the original plan, which involved flying the Hangchow and Shanghai film 800 miles north to Peking to be transmitted by the mobile ground station there.

It also provided far superior communications for telephone, radio and teleprinter transmission from Shanghai and Hangchow, which otherwise would have had to depend on high frequency radio circuits subject to in-

terruption by sunspots and other phenomena.

In April the last of the RCA engineers and technicians will leave, turning the station over to the Chinese. The Chinese are leasing four telephone-grade circuits through INTELSAT IV, the sophisticated 5000-circuit satellite which was moved into position just before Nixon's visit.

The Chinese are leasing four telephone-grade channels through INTELSAT IV.

The Chinese are using two of the circuits for voice transmissions, one for teleprinter service and one for telephoto service.

They are able to "work" the COMSAT station at Jamesburg, California, and earth stations serving more than a dozen other countries in the Pacific and Asia area. If they add a second antenna, they can transmit to the Middle East, Europe and Africa through the INTELSAT satellite over the Indian Ocean.

President Nixon's China policy is predicated on the assumption that prospects for peace and stability in Asia will improve as Peking moves more fully into the international community, permitting more discussion of the explosive issues there.

The availability of prompt and reliable communications is an essential ingredient in this process. And it is clear that a giant step forward has been taken.

Queen Elizabeth 2 being used for satellite tests

BY JOACHIM KAISER

As part of the DICOM (digital communications) terminal project, the Communications Processing Lab at COMSAT Laboratories has started a shipboard communications terminal project. The goal is to demonstrate the feasibility of providing good quality digital voice and data communications between ships, and ship-to-shore, via satellite.

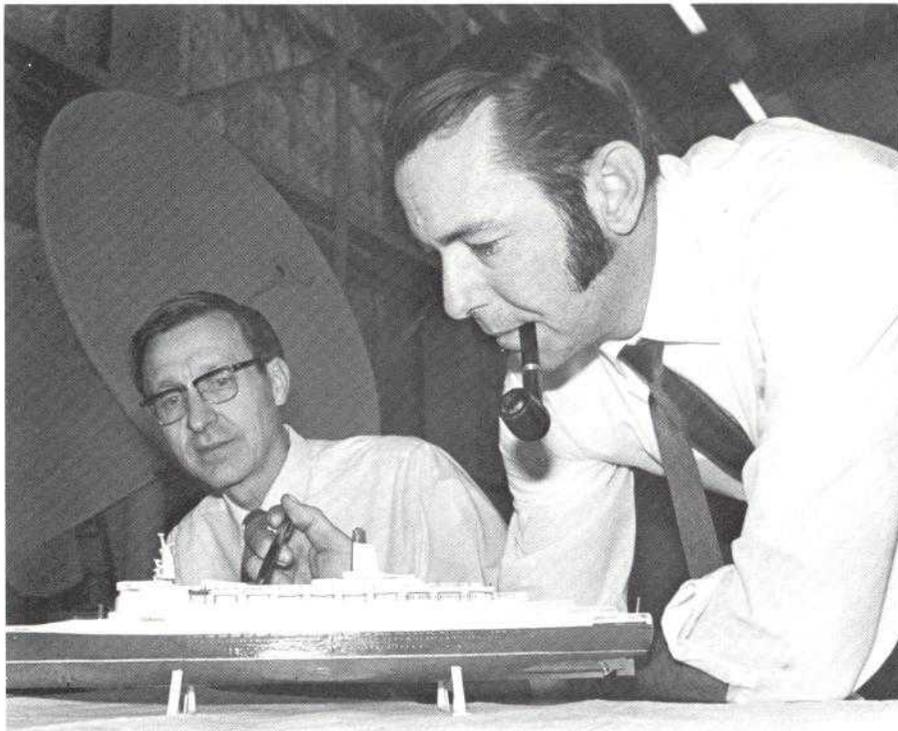
The idea for this project originated during a visit to the Laboratories by Col. J. D. Parker, of Comite International Radio-Maritime, London. The use of a small digital communications terminal of the type being developed in the Labs under the direction of John Puente, manager, Communications Processing Lab, appeared particularly attractive. It was decided to use the INTELSAT IV, F-2 over the Atlantic Ocean for the experiment.

The road from the conception of the idea to working hardware was not an easy one. But, with the cooperation of a number of U.S. firms, the British Cunard lines, and ICSC subcommittees, the project is well under way.

The master of Cunard's Queen Elizabeth 2, Commodore W. E. Warwick, a firm supporter of technical innovations, pledged the use of his ship as a platform for the experiment. The Bendix Corporation loaned us a suitable antenna and a gyro. They just happened to have an eight-foot parabolic-dish antenna, with an appropriate elevation over azimuth servo-driven mount, all operable at 4 and 6 GHz.

We were also able to borrow from Bendix, at no charge, a second antenna and a very precise directional gyro. With very short lead time, the Labs also purchased a Bendix vertical gyro. Gyros are used to stabilize the

■ Mr. Kaiser is senior staff scientist in the Communications Processing Lab and project manager for the shipboard terminal project.



Team member John McClanahan (right) shows project manager Kim Kaiser the approximate location of the antenna on a model of the QE 2.

antenna, compensating for the ship's roll and pitch and course changes so that the antenna continuously points at the satellite despite the ship's motions.

Of the many ways of stabilizing such an antenna, we chose an open loop system because of its simplicity. The fact that the Queen Elizabeth 2 is normally roll-stabilized (that is, its rolling motions are reduced to small angular excursions) helps to keep the antenna stabilization system simple. Open-loop stabilization requires that the satellite be acquired by pointing the antenna according to precomputed azimuth and elevation angles. Subsequently, if all of the conglomerate hardware functions properly, the gyros will keep the antenna pointing accurately at the satellite.

With an antenna beamwidth of less than about two degrees, the error budget for all parts of the pointing system is quite stringent. Translational motion of the ship (that is, its travel to and from its destinations) requires readjustment of the pointing angles from time to time.

The antenna and the associated communications terminal were placed on board the Queen Elizabeth 2 in

mid-March by means of a helicopter, as there were no cranes capable of reaching the lofty heights of the ship's top deck.

The communications demonstration will be made using two satellite repeaters, with one end of the link terminating in a 15-foot dish at Clarksburg. One repeater is required for the ship-to-shore link using the spot beam; the other repeater is needed for the shore-to-ship link using the global beam of the satellite.

As the experiment will require an entire transponder for the one two-way link using 28-kilobit Delta-modulated voice and requiring about 80 KHz RF bandwidth, one transponder could support about ten such links if the terminal equipment were available. There is, however, no intention to add terminals to this experiment, since feasibility can be demonstrated with the present equipment.

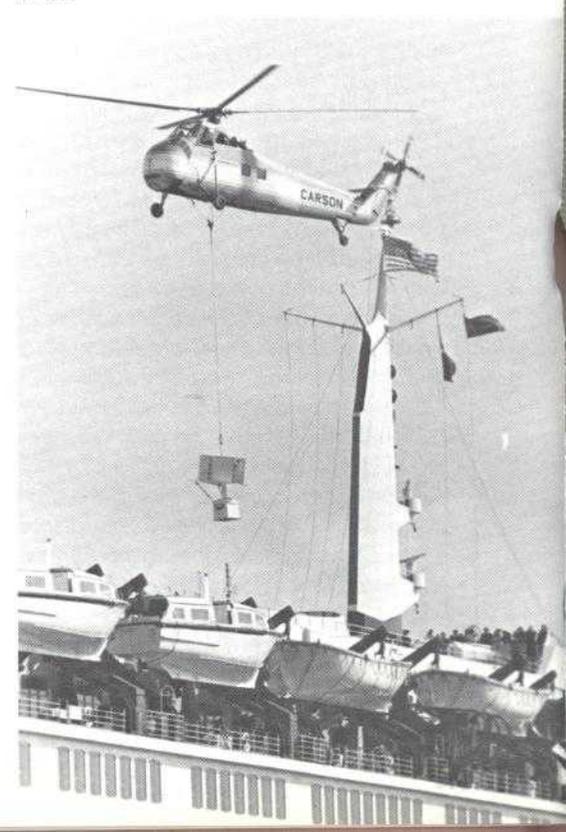
The ship's terminal has a low-noise receiver mounted directly behind the antenna feed, and sports a 20-watt traveling wave tube amplifier which will deliver about eight watts of RF power at the feed. The remainder goes to losses in cables, rotary joints, and such.

One of the primary purposes of the experiment is to show that a satellite communications link can be established from ship to shore with a simple, inexpensive terminal on a ship. To do the job from scratch would require about 20 engineers, take two years, cost \$2 million, and result in hardware weighing two tons.

To emphasize the economy of our task, the present project is being accomplished with only two full-time engineers, John McClanahan and the author. It will cost about \$40,000. The equipment will weigh about a ton, and the experiment will have been completed in less than a year. To accomplish this, much of the antenna driving system was "converted" from existing surplus gear, such as the Telstar telemetry and tracking systems.

The conversion of this surplus equipment and the adaptation of a hodgepodge of feeds, transmitters, and up and down converters to a working system is the result of the project team's combined ingenuity. Many colleagues at the Labs have contributed their advice and skills. Dick McClure tamed the 400-cycle instrument servos, while Ken Pease helped immensely with inventive ideas on the antenna feed and pattern measurements. Our co-op student Dick Crow

A helicopter lowers the antenna onto the upper deck of the Queen Elizabeth.



applied himself diligently to the arduous task of wiring the antenna driver bay. Bill Kerns, Laurie Gray, Wally Mercer, Bob Gruner, Perry Klein, George Welti, and Gary Gordon also contributed helpful ideas.

The model shop under Ron Kessler, with John Sickle and his crew, converted our sometimes minimal drawings into working hardware. Of course, the shipboard terminal, as a part of the DICOM project, depends heavily on the DICOM staff. Gene Cacciamani, Drew Walker, and Alan Dohne provided the communications subsystem, while echo suppression and the adaptation of the four-wire satellite link to a two-wire telephone system was accomplished under the direction of Henry Suyderhoud.

The communications experiments should prove most interesting. Present plans call for telephone service, on a limited experimental basis only, from passenger staterooms to one of two different ship switchboards to the shipboard terminal, thence via-satellite to the DICOM station in Clarksburg and via the normal telephone networks to distant destinations. In addition to voice communication, it is planned to use a portable computer terminal to obtain shipboard antenna pointing data from the COMSAT computer.

Also, Communications Services Corporation of Rockville, Md., has offered the use of their "BIOSERV" unit for demonstration purposes. This unit permits the recording of electrocardiograms on board ship, which are then sent to the COMSAT computer for analysis and returned to the ship via the computer terminal and/or a Xerox flat bed facsimile machine.

While the technical aspects of the shipboard experiment are the responsibility of the Communications Processing Lab, the many administrative and international aspects of the project have been expertly handled by the staff and colleagues of Ed Martin, John Keyes, and Ed Wright.

INTELSAT has consented to make the space segment available for these experiments.

It is hoped that this experiment and its diverse communications demonstrations will focus attention on the many possibilities for satellite links between ships and shore.

Apollo 16 to sample lunar highlands

On the afternoon of the fifth day of the Apollo 16 mission, Astronauts Young and Duke are scheduled to gently lower their lunar module into a crater known as Descartes in the mountainous highland of the moon.

Descartes is a key site in the lunar exploration program, complementing the earlier Apollo 11 and 12 missions to Maria, the Apollo 14 landing in the Fra Mauro uplands and the Apollo 15 landing at Hadley-Apennine, a northern plain flanked by a deep gorge and high mountains. The Descartes crater lies about nine degrees east and 16 degrees south of the center of the moon, as viewed from earth, in the central lunar highlands.

This site will provide two distinct primary sampling objectives which should aid scientists in obtaining data to complete the lunar models now being developed.

The first sampling objective, where the astronauts will land, will be the highlands basin fill. This area contains large amounts of volcanic-appearing material, which floods many of the large highland craters. Geological evidence indicates that this material is older than the old mare sampled on Apollo 11 and 12 flights (or about 3½ billion years old) but younger than the Imbrium basin ejecta

sampled by the Apollo 14 astronauts. When combined with the Apollo 15 samples obtained at the Hadley-Apennine site, these samples should help to further develop the theory of lunar evolution.

The second sampling objective is hilly, grooved and furrowed terrain, also assumed to be volcanic. Called uplands volcanics, this area is thought to be of similar age but of a different composition than the basin fill. The mare basalts are giving clues to the lunar interior composition, and it is hoped that the upland volcanics will yield data on the interior composition of the thick highland crust.

It is also hoped that information will be obtained that indicates how these highlands which cover more than three quarters of the lunar surface were formed. The formation is believed to have begun soon after the origin of the solar system 4½ billion years ago.

Some of the craters in the landing sites appear to have been caused by debris falling from the explosive event that gouged out the huge Imbrium Basin of the moon, almost 4 billion years ago. Much of the region around the landing site seems to have been formed by very early lava flows, and scientists believe this region to be one of the oldest areas of the moon.

SPADE wins "new products" award

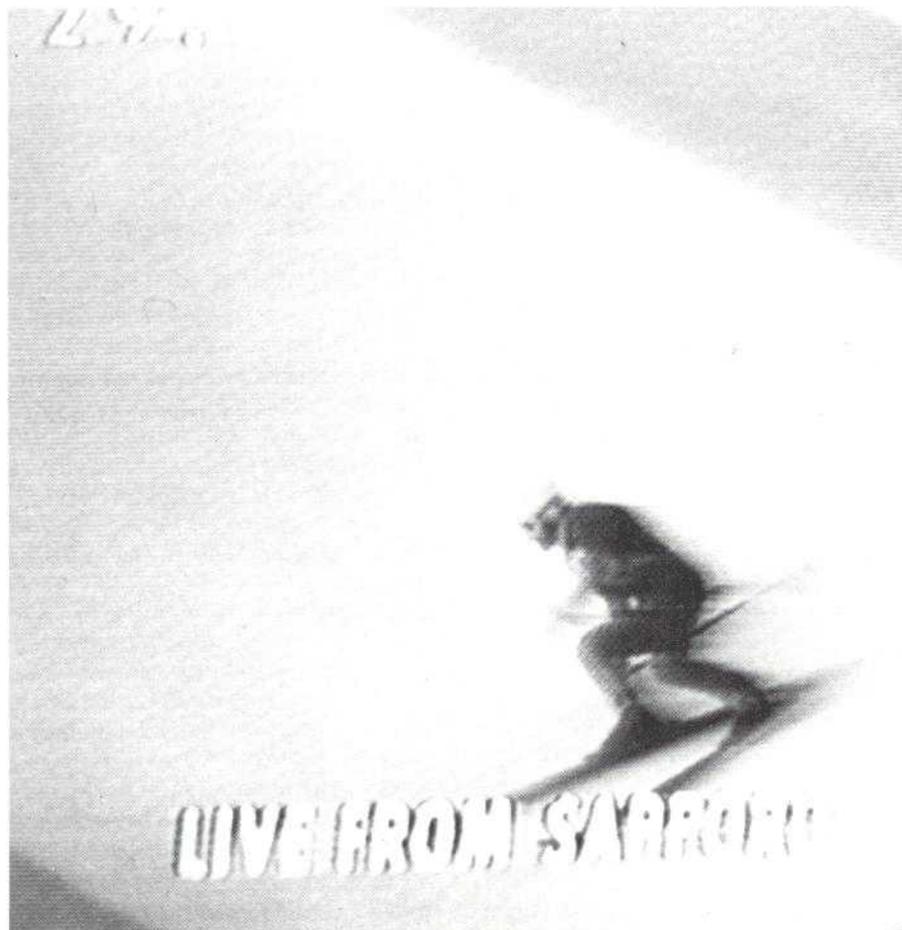
In a recent letter, Mr. Koji Kobayashi, President of Nippon Electric Company of Tokyo, informed COMSAT President Dr. Joseph V. Charyk that Nippon Electric has been awarded the Masuda Prize for 1971 for its work in the development of the SPADE system.

This award, presented by The Nikkan Kogyo Shinbun, a leading Japanese industrial daily newspaper, chose the system as the best of "10 outstanding new products in Japan in 1971."

Mr. Kobayashi stated that it is a great honor for a Japanese manufacturer to receive this prize and that his firm has made "a fresh determination to do our utmost to contribute further to the world in the field of satellite communications."



The Winter Olympics figure skating finals—via satellite.



A member of the U.S. ski team heads for the finish line at the Sapporo Olympics.

Heavy TV use results from Sapporo Olympics

In early February B.C. (Before China), broadcasters made heavy use of the satellite system for extensive coverage of the Winter Olympic Games in Sapporo, Japan.

For the period of the games from February 3 through February 13, telecasts via satellite from the snowy slopes of Sapporo to overseas points accounted for 322 half-channel hours of satellite time.

That was more than four times the amount of satellite time used during the previous Winter Olympics held at Grenoble, France, in 1968, according to data maintained by Operations' Analysis and Traffic Division. (Half-channel hours are the sum of the transmit and all receive legs.)

All telecasts from Japan to the United States and Canada were routed through the Jamesburg, California, earth station, which also served as the main terminal during the latter half of February for heavy TV and message traffic during President Nixon's trip to the People's Republic of China.

NBC aired the games in this country. The satellite relay generally received favorable comment.

On the Japan-U.S.-Canada link, the INTELSAT III satellite, replaced February 14 by an INTELSAT IV, relayed the telecasts. For telecasts from Japan to Europe, the Indian Ocean INTELSAT III was used.

COMSAT to host satellite symposium

On April 27 and 28, COMSAT will host its first industrial symposium on satellite communications. Representatives from over 100 leading U.S. industries as well as from the Department of Defense have been invited to attend.

The objective of the symposium is to develop a better understanding of the unique capabilities of satellite communications.

Although the world is generally familiar with the use of satellite communications as the means of providing TV coverage of such events as President Nixon's recent visit to the People's Republic of China, there are many other applications which are not generally recognized. It is these applications which will be emphasized during the symposium to provide a better realization of the real impact and potential of this new dimension in communications.

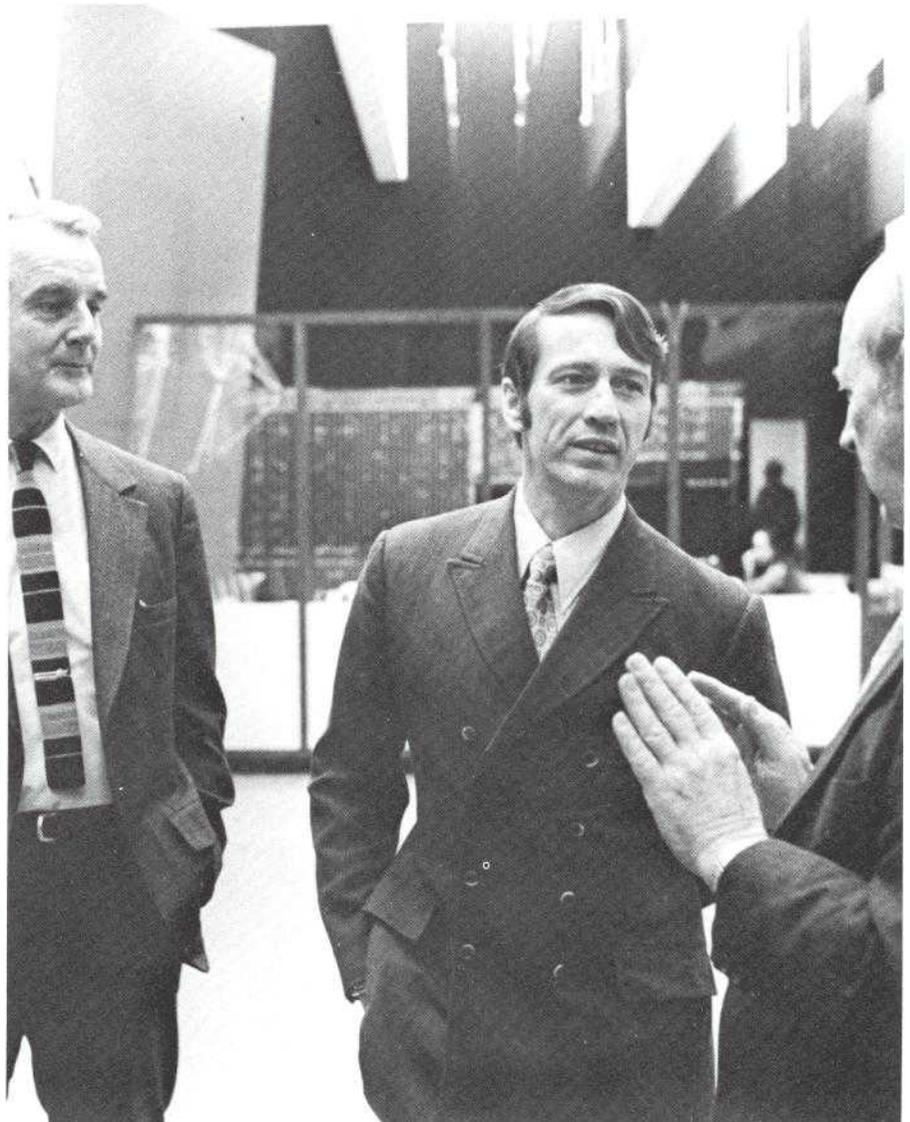
The symposium will attempt to answer such questions as:

- What improvements in management information, data transmissions and other real-time communications networks are possible with this new technology?
- Can economies of scale be achieved which will benefit the large industrial user of communications?
- What does the future hold, and how could these new potentials be incorporated into communications planning?

To accomplish its objective, the symposium will incorporate into its program an exposure to all phases of satellite communications.

The first day of the meeting will be devoted to a comprehensive review of the history of the development of international communication systems, the development of the global satellite communications system, and its impact on international trade. This will be followed by a discussion on the economics of satellite communications and its effect on rates and tariffs.

The afternoon session includes a series of tests and demonstrations of several new communications services using actual satellite links.



Astronaut learns of satellite communications

Astronaut Donn F. Eisele (center), a veteran of the first manned Apollo flight in 1968, visits COMSAT as the guest of John J. Peterson (left), a COMSAT Information Officer and former special assistant to the Chief of Astronauts.

Lawrence Covert (right), manager of the Operations Center, explains global operations of the satellite system to Col. Eisele.

Visits to the Spacecraft Technical Control Center and the Operations Center will complete the formal part of the day's activities.

On the morning of the second day, the group will visit the COMSAT Laboratories where a series of presentations will highlight the progress made in the development of new communications applications. A discussion on digital communications processing and transmission techniques will be followed by tests and demonstrations using the DICOM

earth station operating directly with an Atlantic IV satellite.

This will be followed in the afternoon by a discussion on the planned COMSAT domestic satellite services. The meeting will conclude with a panel devoted to answering specific questions relating to the use of commercial satellite communications.

A highlight of the symposium will be an address by COMSAT President Dr. Joseph V. Charyk on the impact of satellite technology as it relates to international organizations.



Mike Waldman, Dr. Milankovic of the Yugoslavia Community of PTT and George P. Sampson, COMSAT Vice President-Operations, in conference.

Operational plans agreed to at regional meeting

A conference of the Atlantic Region Operations Representatives was held in Dubrovnik, Yugoslavia, in early February. Thirty-three administrations, represented by 49 delegates, including COMSAT as Manager discussed operational and contingency plans for the 1972-1975 time period.

Included was an open discussion regarding the future employment of SPADE in the Atlantic region. It was generally agreed to introduce SPADE on a limited basis during 1973, with greatly increased use of the service planned by the end of 1975.

The Manager also reviewed the work accomplished by the ICSC/T-TDMA working party. It was decided that a comprehensive study on the impact of TDMA should be provided to the Operations Representatives for review before a decision is reached on operational implementation.

At the conclusion of the conference the delegate from Peru offered to host the representatives' next conference, which was scheduled for early 1973 in Lima.

Yugoslavia hosts regional conference

BY MIKE WALDMAN

This article presents Mr. Waldman's personal impressions of his stay in Yugoslavia.

Yugoslavia became the first Communist country to host an INTELSAT conference when the Atlantic Region Operations Representatives met in Dubrovnik early in February. While the meeting was held in a modern hotel on the shores of the Adriatic, the delegates were in full view of the medieval walled city of Dubrovnik, a five-minute walk from the hotel.

A few hundred yards off shore was the island where Richard the Lion-Hearted built a church on his return from the Crusades. The Adriatic is a beautiful deep blue and is generally calm. However, when we first arrived there was quite a storm and the waves were breaking against the dining room windows on the second floor of the hotel.

Although it was not the height of

■ Mr. Waldman is manager, INTELSAT support office in Operations.

the tourist season, a large number of visitors were in town due to school holidays throughout Europe. As a result, most of the shops catering to tourists were open during our stay. However, the casinos and night clubs in the immediate vicinity were not open, nor was the nudist camp in Milini. Some of the delegates thought this was unfortunate.

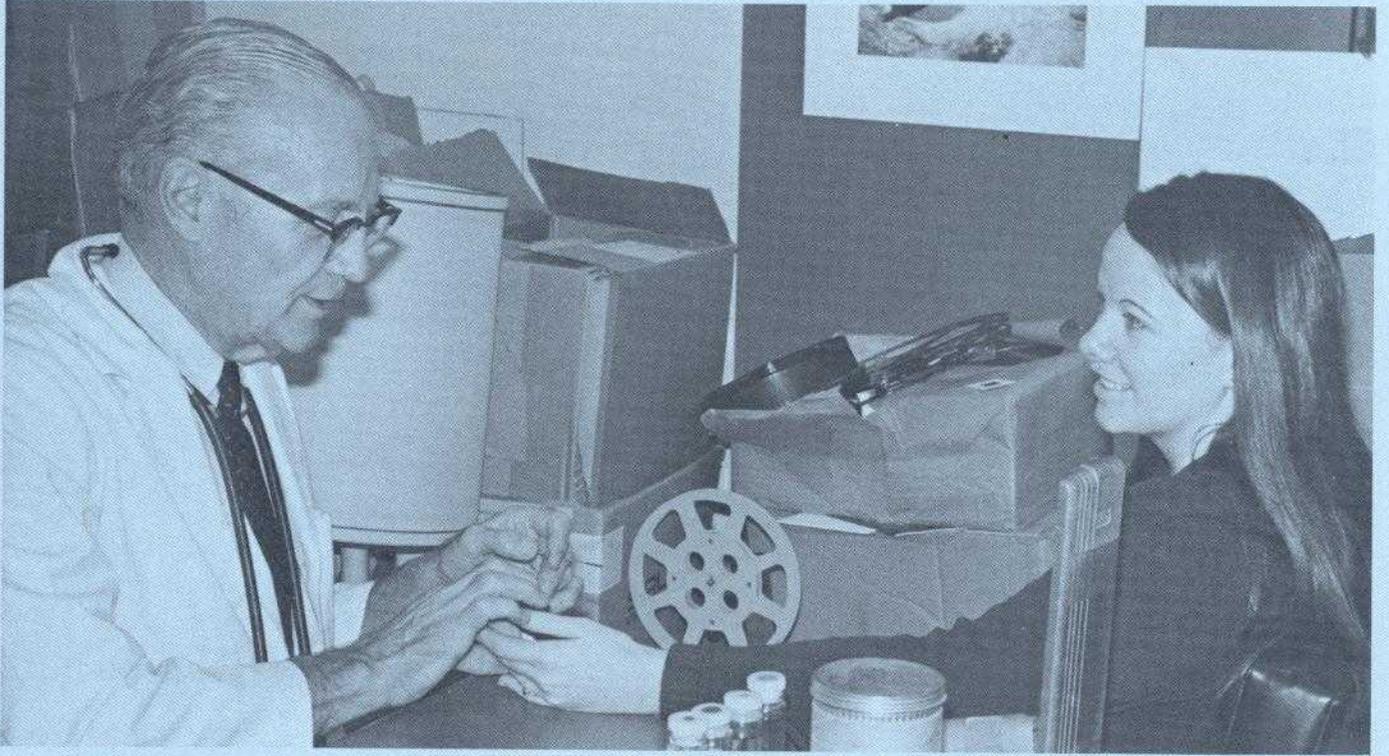
There were a large number of shops in Dubrovnik. The variety of merchandise was limited and the prices were generally the same in all the stores as they were apparently state-owned and operated. The filigree jewelry, made locally, was especially beautiful and very reasonable. Other local items included wood products; e.g., plates, bowls, carvings, etc., handmade clothing and linen, lace and cutwork, tablecloths. As in most European countries, there was no language problem as each shop had at least one clerk who could speak English. The same held true for the hotels and restaurants.

On Friday following the conference, the delegates were taken on a one-day bus excursion down the southern coast of Yugoslavia to the island of Sueti Stefan. A good part of the trip was over narrow mountain roads with numerous hairpin turns more suited for travel by mule rather than on tour buses. Fortunately, traffic was very light and we all survived. Many of the villages and towns along the way still showed signs of damage from World War II when they were bombed and burned by the Germans, and some bore the scars of earlier conflicts.

First-class hotels are available along the entire Yugoslavian Adriatic Coast, and because of the relatively low cost for hotel rooms and meals, this area is one of the most popular vacation spots in Europe. You can live "fairly far forward on the pig" for between \$10.00 and \$15.00 per day.

One pleasant discovery was the excellence of the white wine produced around Mostar. This wine compares favorably with German white Rhine wines, is cheaper and, best of all, is available locally.

Anyone vacationing in Europe should not overlook visiting this area for sun and fun and a fascinating history lesson.



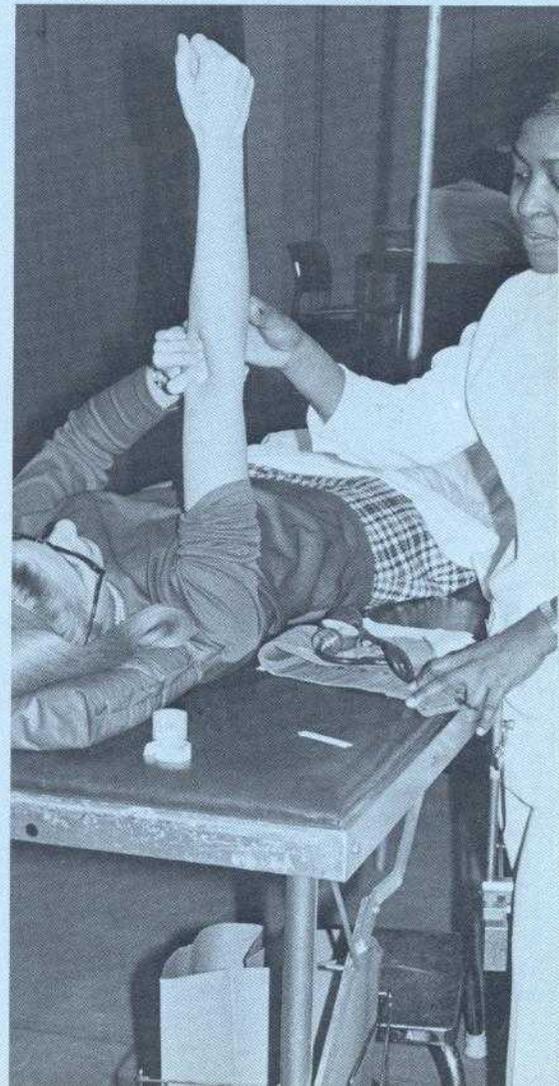
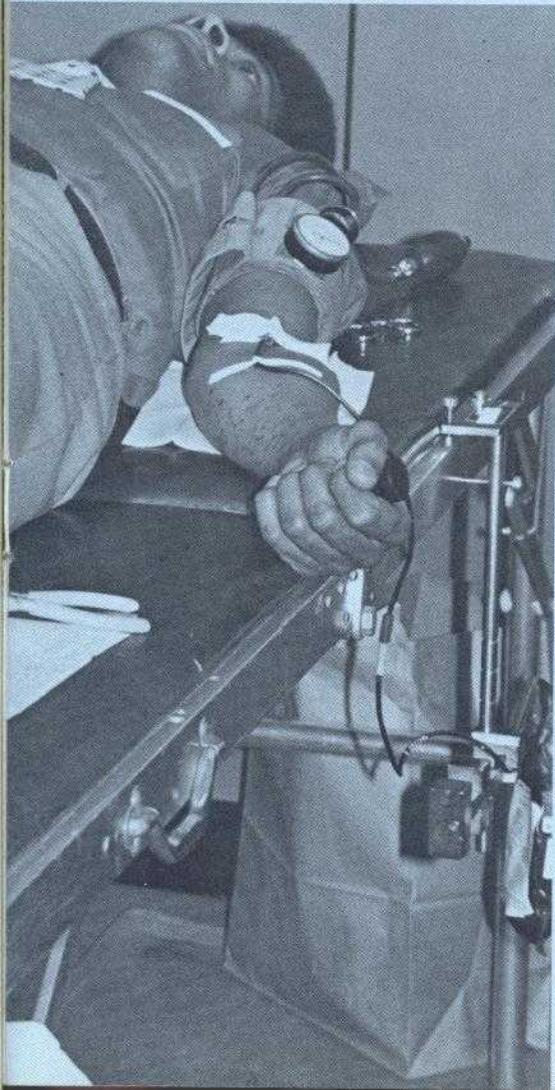
COMSAT EMPLOYEE NEWS

1972 blood drive

More than 65 COMSAT employees donated blood during the Red Cross Blood drive during January.

The COMSAT Headquarters medical unit under the direction of Hazel Durant coordinated this worthwhile program.

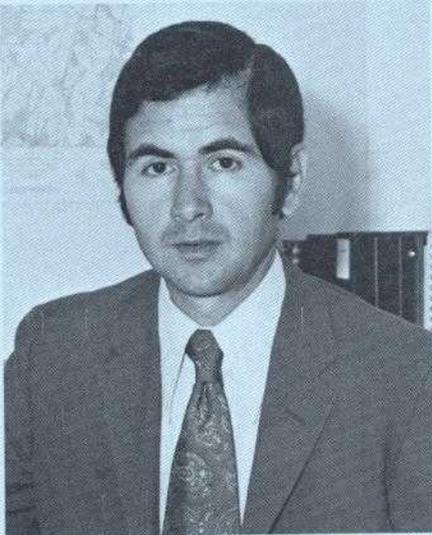
In order to meet the quota for the year, a second drive will be held in May for employees who were unable to participate in January's drive.



Cacciamani earns doctorate with COMSAT assistance

By SHIRLEY H. TAYLOR

Eugene R. Cacciamani, section head in the modulation techniques branch, Communications Processing Laboratory, received his Doctor of Philosophy degree from the Catholic University of America in February.



Dr. Cacciamani

Dr. Cacciamani entered the graduate program leading to his advanced degree in September 1965. He is the first Labs staff member to earn his doctorate under the COMSAT Educational Assistance Plan.

Dr. Cacciamani, known to his co-workers and friends as Gene, came to COMSAT in June 1965 from RCA, where he was a member of the technical staff. He worked in Operations for nearly two years. In April 1967, he transferred to the Communications Processing Lab in the newly-organized Laboratories. Gene was appointed a section head in June 1969 and last month was promoted to branch manager, modulation techniques.

He took his undergraduate work at Union College in New York, graduating in electrical engineering in 1958.

■ Mrs. Taylor is secretary to the Senior Staff Scientist, COMSAT Labs.

He then went on to earn his Master's Degree at Catholic University in 1962.

His dissertation for the Ph.D. concerns optical character recognition and is entitled, "Feature Extraction and Selection Using N-tuple Logics for Recognition of Hand-Printed Alphanumerical Characters".

Gene is a member of the IEEE and Sigma Xi, an honorary scientific society. He has presented a number of papers at various technical meetings during the past several years and had a paper published in the first issue of the *COMSAT Technical Review*. In addition, he is a co-inventor of two patent disclosures presently in process.

Dr. Cacciamani lives in Rockville, Maryland, with his wife, Martha, daughter, Amy, and son, David.

COMSAT benefits provide surgical aid

By DONALD J. CHONTOS
AND WALTER J. KUTRIP

This is the seventh in a series of articles prepared by the Personnel Office to explain COMSAT's employee benefits program.

The last article continued the discussion of COMSAT's medical insurance plan, explaining the hospital insurance benefits.

This article outlines other benefits provided by the medical insurance plan.

Under COMSAT's surgical coverage, a benefit will be paid for each covered surgical procedure performed on an individual as a result of a non-occupational injury, disease or illness. The benefit will include reimbursement for charges by a physician for:

- Performance of the surgical procedure.
- Necessary pre-operative treatment during hospital confinement.
- Customary post-operative treatment furnished in connection with the procedure.

■ Mr. Chontos is manager, employee benefits. Mr. Kutrip is manager, employee services.

The amount of the benefit will be either the actual amount charged by the physician for performing the surgical procedure or the maximum amount allowable on the surgical procedure schedule maintained by the insurance company, whichever is less. A partial list of maximum procedure payments is maintained by the employee benefits department and is included in the group insurance plan booklets recently distributed.

Charges in excess of the maximum benefit allowed in the surgical procedure schedule will be reimbursable under Major Medical Insurance without having to satisfy the normal cash deductible.

If more than one procedure is performed at the same operative session, the maximum benefit may be greater than that indicated by the schedule. The total benefit payable in connection with all procedures performed at the same operative session, however, shall not exceed \$1,125. The total benefit payable for the same surgical procedure performed more than once at separate operative sessions shall not exceed \$750, unless the insurance company receives satisfactory evidence that:

- (1) The cause of the procedure or procedures at the later operative session are unrelated to the causes of the procedure performed at the previous session, or
- (2) The later operative session occurred after the individual had completely recovered from the causes of the procedure or procedures performed at the previous operative session, or
- (3) In the case of an employee, the later operative session occurred after he had returned to work and completed one full day of active service.

In-Hospital Physician Benefit

This coverage will pay for the charges for medical treatment visits made by a physician to you or a dependent during a period of hospital confinement.

Payment for each such visit will be made up to a maximum of \$18 for the first day, \$12 for the second and third days, and \$6 per day thereafter. The total benefit payable for all such visits during any one continuous period of disability shall not exceed \$720.

Charges in excess of the maximum daily or total charges are covered under Major Medical Insurance after satisfaction of the required deductible.

Laboratory and X-ray Benefits

This coverage will help defray the cost of reasonable and customary charges made to an individual for laboratory and/or X-ray examinations in connection with the diagnosis of a non-occupational injury or disease.

The amount of benefit payable will be equal to the amount of the charge for the services rendered up to a maximum benefit of \$50 for:

- All injuries resulting from any one accident, or
- All illnesses or diseases in any six consecutive months.

Charges in excess of the maximum \$50 are covered by Major Medical Insurance after satisfaction of the required deductible.

Emergency Accident Treatment Benefit

An employee or dependent requiring emergency treatment as a result of a non-occupational accident, will have benefits available from either of two sources.

If the emergency treatment is furnished by a hospital, normally via the emergency room or out-patient care unit, charges will be reimbursable in accordance with the out-patient provisions of the hospital insurance. If the emergency care treatment is furnished by a physician, normally in his office, charges are reimbursable under emergency accident treatment insurance.

An employee or dependent incurring charges for emergency accident treatment shall be reimbursed for all such charges up to a maximum of:

- (1) \$25 in connection with any one accident, and/or
- (2) \$50 in connection with all accidents suffered in any one calendar year.

Charges in excess of the maximums described above are covered under Major Medical Insurance after satisfaction of the required deductible.

Benefits shall not be payable, however, for any charges incurred:

- For other than the first such treatment following the accident,
- For treatment received more than 24 hours after such accident,
- For which any benefits are payable under any other COMSAT medical insurance coverages, and
- Under any of the circumstances outlined in the "Limitations and Exclusions" section of the Group Insurance Plan's booklet.

Maternity Benefits

Maternity benefits, as described below, will be paid if a female employee or the wife of an employee who has dependent coverage, as a result of pregnancy:

- (1) Becomes confined in a hospital, or
- (2) Undergoes a surgical procedure specified in the Schedule of Surgical Operations and Benefits under the heading "Obstetrical Procedures." Benefits will also be available to a female employee or wife of an employee whose insurance has terminated, if it can be established to the satisfaction of the insurance company that pregnancy existed on the date of insurance termination.

Payments will be made to the hospital where confined for all "reasonable and customary" charges for semi-private room and board and covered special services to a maximum of \$250 for any one pregnancy.

Payment will be made for obstetrical procedures according to the Schedule of Surgical Operations and Benefits. This schedule allows the following maximum charges:

• Normal Delivery.....	\$150
• Caesarean Section.....	\$300
• Miscarriage.....	\$ 75

The next article in this series will discuss major medical benefits.



Mr. Castanera

Ecoss de la Montana

BY LUIS R. RODRIGUEZ

Cayey recently bid farewell to Juan R. Castanera, our long-time station manager who was transferred to NICATELSAT in February. A good-bye cocktail party was hosted by the Lee Jondahls.

As a token of remembrance Mr. Castanera's fellow-workers presented him with a case of aged Bacardi rum, an item most difficult to come by in Nicaragua.

The CCEA also presented Mrs. Castanera with a silver-plated coffee set to use as she serves that delicious Nicaraguan coffee.

Good-bye and good luck to you both!

Congratulations to Otto and Ada Awilda Irizarry on the birth of their fourth child. Jose Enrique who weighed 8 lbs. 6 oz. at birth was born at the Hospital San Rafael in Caguas on January 21. Mother and son are doing fine!

■ Mr. Rodriguez is administrator at the Cayey Earth Station.

At Andover

By JOANNE WITAS

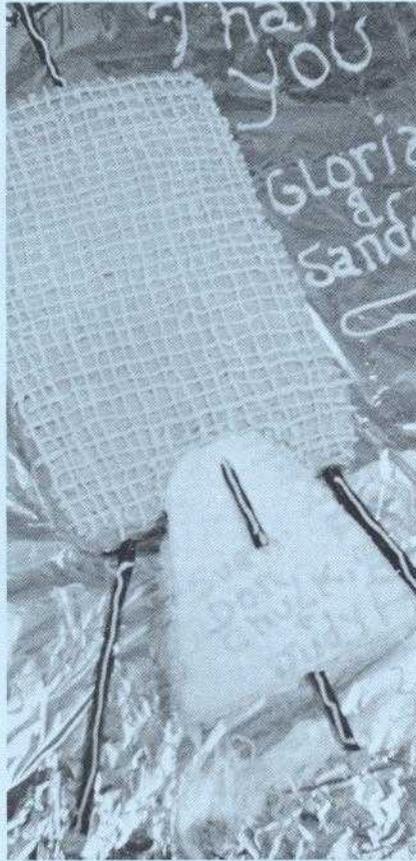
During the week of January 24-28, Andover played host to two girls from the senior class at Stephens High School in Rumford. It was "independent study week" at school, and the members of the senior class worked with local businesses for a week.

Gloria Cunningham and Sandra Gautreau selected COMSAT as their choice. Gloria worked with Judy Hodgkins, learning secretarial procedures, while Sandra worked with Chuck Lepage, learning how a satellite was tracked. On Friday, their last day with us, the girls brought in a cake made in the shape of a satellite, which said "thanks" for a wonderful week.

Andover was host to the Torgle Tokle League of the United States Amateur Ski Association on February 19 and 20. Approximately 150 children, ages 8-13, attended this championship meet for competitors from the New England and upper New York State areas. Ski jumping was

■ Mrs. Witas is personnel-accounting clerk at the Andover Earth Station.

Chuck Lepage completes a seascape.



Gloria and Sandy say, "thank you."

held at Black Mountain outside of Rumford and the Cross Country meet was featured on the second day at Andover.

The different classes in the meet were determined by age. In the girls' Class Four, Karen Sauret, age 10, placed first to make her the New England Champ. She is the daughter of Mr. and Mrs. Herman Sauret. (He is our facilities engineer.) Also competing in Class Four was Ann Marie Summerton, age 11. Ann Marie is the daughter of Mr. and Mrs. Ralph Summerton. (He is our operations supervisor.) She finished seventh.

In the girls' Class Five, Mary Ann Jaros, age 8, placed first to make her the New England champ in her class. She is the daughter of Mr. and Mrs. Charles Jaros. (He is one of our technicians.)

Karen, Ann Marie, and Mary Ann are also members of the Pineland Ski Club, in addition to Debbie and Sharon Briggs, the daughters of Mr. and Mrs. Al Briggs. (He is one of our facilities mechanics.) Our congratulations to all the girls who com-

peted for their display of talent and sportsmanship.

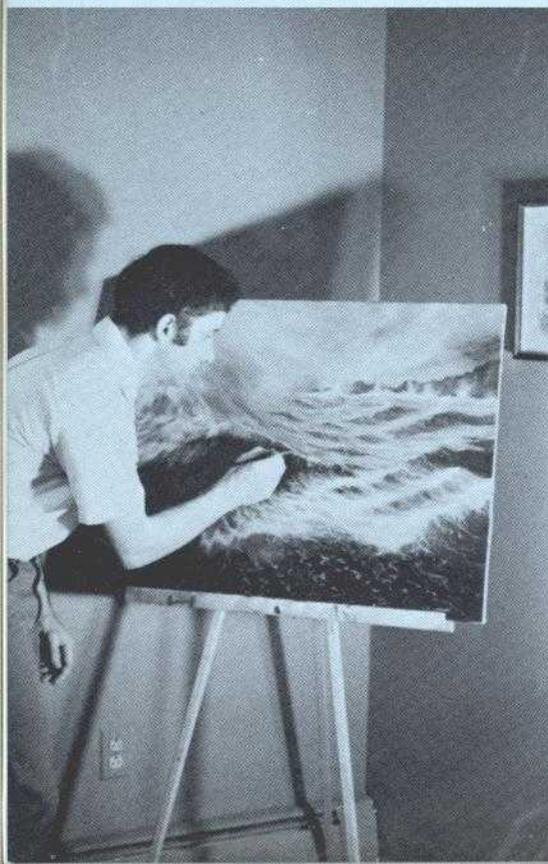
Charles 'Chuck' Lepage, TT&C supervisor, finds art a relaxing pastime. Chuck completed a three-year home study art course in 1963 and taught art classes while working with Hughes Aircraft in Caribou, Maine. He is presently teaching art classes in Andover. His primary interests are in oils, water color and charcoal sketching. His work has been on display at Hughes Aircraft locations here and in California.

Alaskana

In a recent article the COMSAT News printed a list of colloquial expressions frequently used in our forty-ninth State.

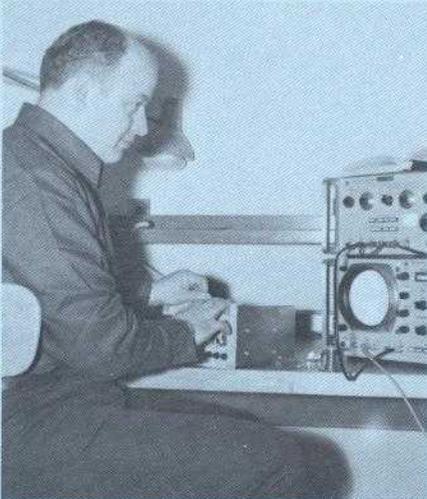
Following is a list of interesting facts about Alaska as compiled by Jim Shaff and Patti McKenna of the Bartlett Earth Station staff.

- The word "Alaska" is derived from the Aleut word "Alashka," meaning the great land.
- The state bird of Alaska is the willow ptarmigan.
- The state flower is the forget-me-not.
- Alaska contains 586,412 square miles, three percent of which is covered by glaciers, and is the largest state in the union.
- Alaska contains the westernmost point in the United States, Cape Wrangell on the island of Attu in the Aleutians.
- Alaska also contains the northernmost point in the United States at Point Barrow.
- Mount McKinley, the highest mountain in the U.S. (20,320 ft.), is in Alaska.
- There are 135 licensed pilots for every 1000 persons living in the state—six times the national average.
- The world's largest grizzly bears are found on Kodiak Island, while the largest sea otter colony in the Pacific basin is located off Amchitka Island.

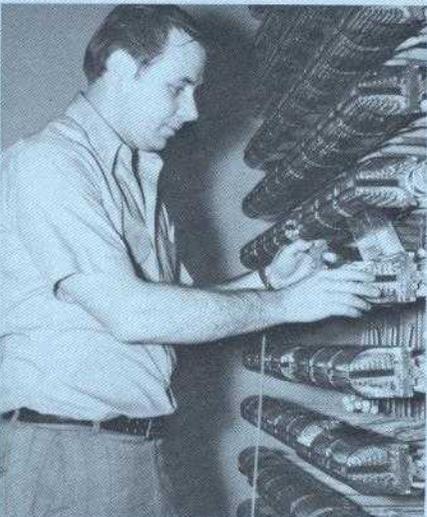




Station engineer Roger Parsons makes a calibration for an upcoming test.



Senior technician Sam St. Clair, the "old master," works with a balky unit.



Cryogenics specialist Jerry Reeves does final tie down on a pair.

At Etam

By DELORIS GOODWIN

The electronic maintenance facility at Etam primarily provides the capability for the maintenance, repair and testing of all communication and cryogenic equipment as well as for the maintenance, repair and calibration of all associated test and electronic support equipment.

In fact, however, this group is fully capable of functioning as an operations team should the need arise. Such flexibility permits maximum effective use of personnel and insures that high service standards are maintained at all times.

At Etam, station engineer Roger Parsons is aided in this vital function by a talented three-man team made up of Bill Mayes, Jerry Reeves and Sam St. Clair.

■ Mrs. Goodwin is accounting and personnel clerk at the Etam Earth Station.



Bill Mayes, senior technician, prepares to locate a trouble in a module that has failed in service.

5-year awards

The following personnel received five-year service awards during February and March:

Andover: James R. Fogg, Harold L. Frazier, Melvin T. Link, and Ronald A. Wells.

Brewster: Donald D. Browning.

Domestic and Aeronautical: William C. Guthrie.

Finance and Administration: Patricia G. Tyson and Joseph O. Wellington.

General Counsel: David C. Acheson and Joyce A. Przelenski.

International: Norma D. Shoemaker, Miles L. Merians and Harry M. Tollerton.

Laboratories: G. Davidson Collins, Calvin B. Cotner, Hubert R. Keel, John D. McClanahan, Henry F. Mueller and Louis C. Pollack.

Management Review and Coordination: Kenneth J. Day.

Operations: Orville H. Habersetzer.

Paumalu: Joe M. Chow and Alan L. Sutton.

Technical: Judy C. Holmes, Henry A. Schutzbier and Vera N. Wilson.

News from Jamesburg

BY M. LEE DORSEY

Kokusai Denshin Denwa Company, Ltd. (KDD) of Japan recently celebrated 100 years in international communications. In honor of this occasion, KDD selected 10 of its company's representatives (from over 100 applicants) to visit communications centers around the world to promote friendship and mutual understanding in the communications industry.

Four of these representatives have been touring the United States, visiting COMSAT, AT&T, RCA, and WUI. KDD representatives are also touring England, Germany, Switzerland, Australia, New Zealand, Singapore, and the Arab Republic of Egypt.

Osamu Shimizu, Assistant Chief of the transmission line control section of the Ibaraki Earth Station, was chosen to visit the Jamesburg Earth Station.

In exchanging information with Mr. Shimizu, we found that the Ibaraki Earth Station differs considerably from our Jamesburg station in that it has three antennas, with a personnel staff of 73, including a station manager, two assistant station managers, two engineers, five line crews (similar to our operations control teams), a transmission line control section, a public relations section, and a general affairs section.

We also learned that Ibaraki No. 3, Japan's newest antenna, is equipped far more elaborately than ours is. For example, it has a separate strip recorder for each transmit and receive carrier. It also is fully redundant for all narrow and broadband equipment, and emergency power equipment.

After leaving Jamesburg, Mr. Shimizu visited California's famed Disneyland, and then travelled to COMSAT's Paumalu station in Hawaii.

Congratulations to senior technician Jimmy L. Clark who was recently selected to be one of COMSAT's

■ Mrs. Dorsey is finance-personnel clerk at the Jamesburg Earth Station.

representatives on the NICATELSAT team.

Jimmy has just successfully completed a Hewlett-Packard seminar on basic microwave measurements in preparation for his new assignment.

Both Jim and his wife, Pam, are extremely pleased about the transfer. They are already taking Spanish lessons two evenings a week. Jim will remain at Jamesburg until June 1, and then will join NICATELSAT.

Additional safety procedures at Plaza

The Director of General Services, J. Robert Loftis, recently announced that additional increased security procedures are now in effect at the Plaza on an interim basis pending the completion of an in-depth study of all security procedures and practices.

In general, managers have been requested to restrict after-normal-duty-hours work to an absolute minimum. Whenever after-normal-duty-hours work is necessary, and particularly on weekends and holidays, managers are encouraged to schedule male employees with the women employees so that the latter are not working alone in the building.

Until further notice, a member of the transportation staff will be available each night, Monday through Friday, from 6 to 8 p.m., to deliver cars of women employees to the Plaza entrance of the COMSAT Building. Employees needing this service should call the transportation office, extension 6621, as far in advance as possible. During the day, car keys should be delivered to the transportation office, Room 1131. Special arrangements must be made for after-8 p.m. delivery if needed. If the car owner is not waiting when the car is delivered to the Plaza, the car will be locked and the keys will be left at the lobby guard post for pick-up when signing out.

The Corporation assumes full responsibility for the employee's car while being delivered, with the exception of loss of personal property.

The Corporation can not be responsible for tickets issued on vehicles parked on the Plaza level for extended periods of time. To decrease this

possibility, employees are urged to meet requested delivery times, or advise the transportation office in advance if the delivery time must be changed.

Special arrangements may also be made for delivery service on weekends and holidays. Such needs must be submitted by the employee's supervisor in advance, to either the Headquarters Executive Officer or the Director of General Services for evaluation and approval.

Managers responsible for special evening activities involving women employees (i.e. contemplated late ICSC meetings, social events, etc.), should notify the transportation office so that additional arrangements for this service can be made.

For those women employees who do not drive cars to work, arrangements can be made through the transportation office for a taxi pick-up at an appointed time. In the event that a taxi can not be obtained, transportation personnel are authorized to drive the employee to the nearest taxi stand or bus station in a corporation vehicle. The driver will remain with the employee until she is safely in a taxi or on a bus.

News from Brewster

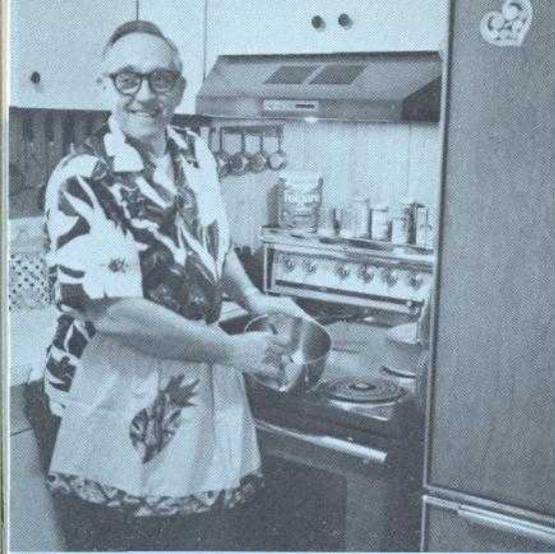
BY ROBERT E. SANDERSON

The BCEA snow party at Echo Valley was great fun. Skiing, skating and snowmobiling were the order of the day. Even though the maps drawn and distributed by Ramon Hashberger caused some confusion, everyone found the lodge. The weatherman cooperated and the weather was great.

Our chef for the evening was Wally Lauterbach, our full-time station manager. The specialty was chili and hot dogs. Ramon Hashberger reports that all the pictures he took should have been great, but something, or nothing, happened when he was developing them. So no pictures.

The Harvey Andersens are proud new grandparents. They plan to visit their daughter and grandson when they take their vacation in June.

■ Mr. Sanderson is electronic maintenance supervisor at the Brewster Earth Station.



Ken Elder as he prepares dinner.

King of the grill

BY ROBERT N. KUMASAKA

When you talk about food with Irene and Ken Elder, it is not difficult to tell which of them is more interested in the subject. Irene may be in charge of the overall domestic chores in the Elder household, but husband Ken is certainly the one in charge of the kitchen.

Ken considers cooking as a hobby and his wife has been his greatest booster. He says, "I love to cook. I always did, ever since I began 'moonlighting' as a short order cook in the Howard Johnson chain of restaurants in Boston. This was back in the late 40s and early 50s when I was working for the New England Telephone & Telegraph Company."

It shouldn't come as a surprise that Ken does all the cooking in his family. Many a housewife would envy the arrangement worked out between Irene and Ken. When the Elders moved out to the Sunset Beach area near the earth station some five years ago, Ken agreed to do all the cooking since Irene had to spend a great deal of her time commuting to her job in Honolulu. "With this arrangement, dinner is ready when I come home from work," says Irene. "Since Ken loves to test his own recipes, the dinner entree is a mystery—and I must admit—always tasty and delicious."

Ken's culinary skills will be put to a test in a few months when he enters

■ *Mr. Kumasaka is administrator of the Paumalu Earth Station.*

a major national cooking contest to be held in Honolulu. This is the National Pineapple Cooking Classic in which the winner in each of four recipe categories will receive a check for \$10,000 with an overall, best-of-contest award of \$15,000 to be made to one of the four category winners, making the grand prize a total of \$25,000.

Ken has a recipe he has been working on for the past few months which he hopes will win him the grand prize. Should Ken's recipe carry him into the finals of the nationwide cook-off at the Royal Hawaiian Hotel in August, it will be the first time he'll find himself competing against some of the country's best cooks.

In 1968 Ken won first place in the men's division of the All-Hawaiian Championship Bake-In and was the runnerup in the overall division. For this he won a trip to a neighboring island and a color TV set. He's hopeful that his canned pineapple recipe can win him the "pot of gold."

Paumalu's contribution to the world of gourmet cooking is a shift supervisor when he is not busily engaged in testing his latest recipes. Ken is considered to be a pioneer at Paumalu, for he joined the station in June 1966. He was promoted to his present position six months later. Last year Ken was selected to represent COMSAT on board the Apollo 14 Recovery Ship in the Pacific.

Ken consented to share a favorite recipe of his—one which he tested for several weeks before he was satisfied with the results. He is sure your family will be satisfied too. Try it.

All of Ken's recipes undergo a critical taste test by his wife, Irene.



PORK CANTONESE

- 2 lb. boned pork shoulder, cut in 1-inch pieces.
- 1 4-oz. can mushrooms, sliced.
- 1 15¾ oz. can pineapple chunks.
- ⅓ cup molasses.
- 1 tbs. soy sauce.
- ¼ cup vinegar.
- 2 large green peppers, cut in chunks.
- 2 round onions, sliced.
- 1½ tbs. cornstarch.

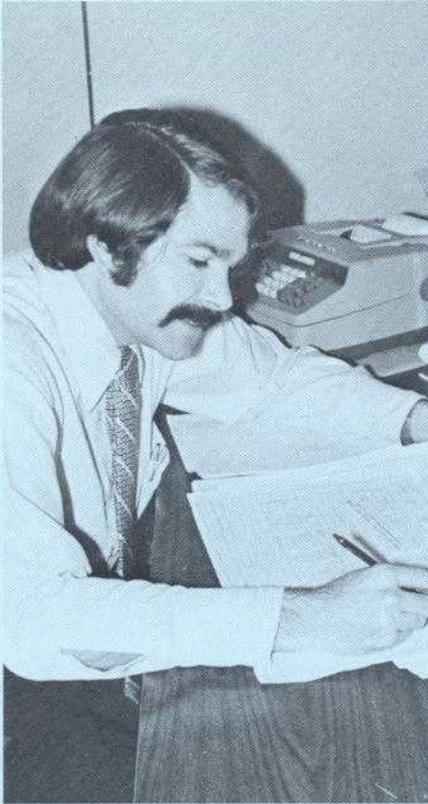
Brown meat in skillet. Add water to combined pineapple and mushroom liquids to make 2 cups; add to meat. Heat to boiling, cover and simmer 1 hour. Stir in molasses, soy sauce and vinegar. Add mushrooms, pineapples, peppers and onions; cook 15 minutes longer. Blend cornstarch with 2 tbs. water and stir into hot mixture. Cook, stirring constantly, until thickened. Serve with hot rice.

Former COMSAT employee dies

Alberto Bracht, a former technical translator with the International staff, died in Fairfax County Hospital on January 29. He left COMSAT in February 1971.

Mr. Bracht had retired from the Argentine diplomatic service before coming to COMSAT. He is survived by his wife Barbara, a COMSAT employee, and two sons.

Mr. Bracht's family expressed gratitude to friends at COMSAT for a memorial gift to the American Cancer Society.

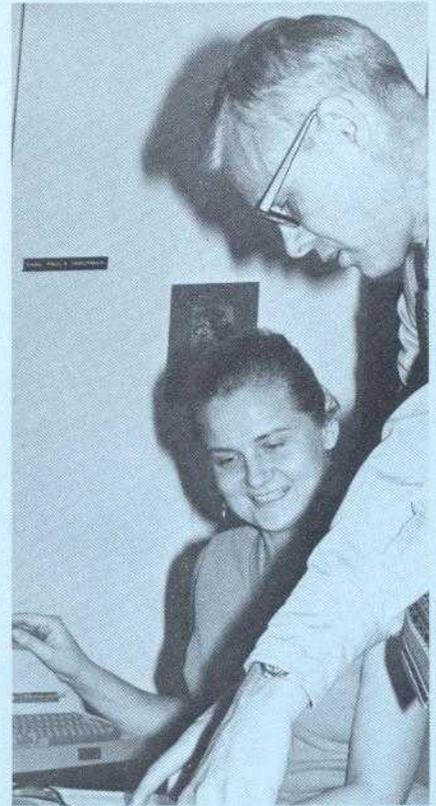


John F. Welsh, staff member, completes a circuit budget sheet.

Past, present and future

The Analysis and Traffic Division is concerned with all three. The Analysis department works with current and historical data pertaining to earth station and systems operations. The Traffic department, on the other hand, looks to the future and provides traffic estimates.

To perform its functions, this division is staffed by personnel with diverse backgrounds in mathematics, statistics, economics and the computer sciences.

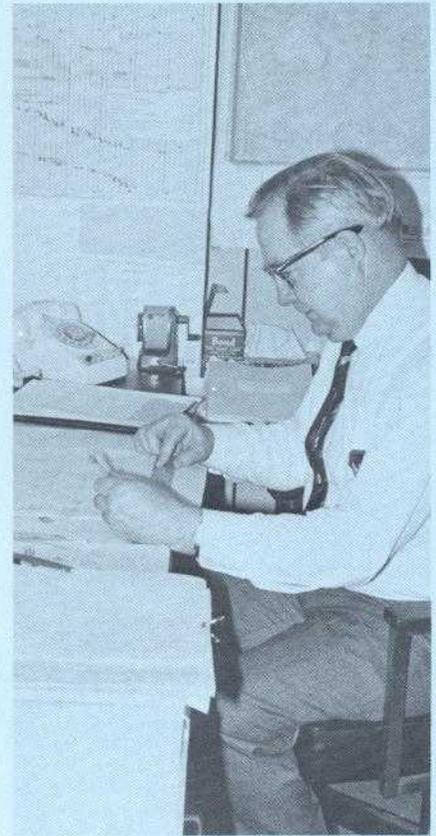


Traffic manager Paul E. Troutman confers with secretary Lenke Marko.

PHOTOS BY J. T. McKENNA



Walter N. Temple, Director, confers with staff member, Dr. Herbert H. Chu, regarding a statical study.



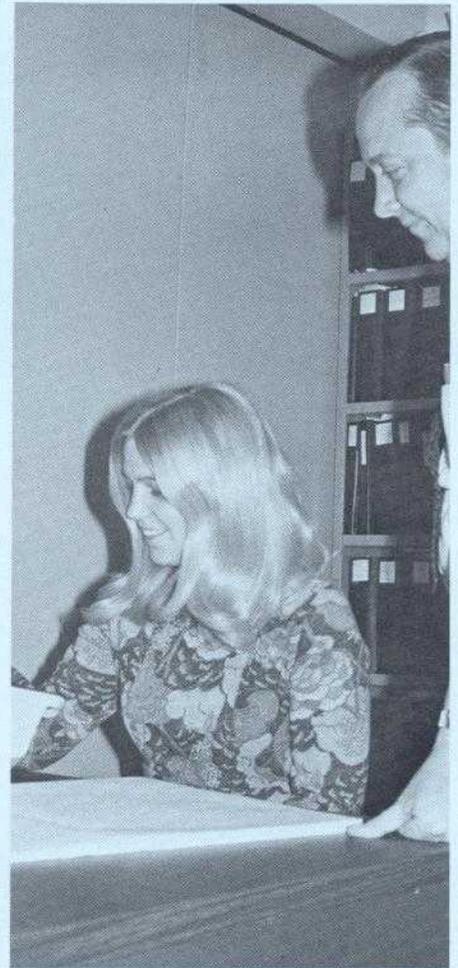
Robert E. Carl, staff member, totals future INTELSAT traffic projections.



Staff members Claire Kummer, James J. May and Viola Newhouse (left to right) review circuit summaries.



Russon L. Poulsen, manager, analysis, discusses an assignment with staff member Sylvia Walker as secretary Barbara Hurley answers the phone.



Staff members Janet Landtbom and Donald A. Fietkiewicz verify a total.

CEA elects 1972 board

BY SHIRLEY A. OLIVER

The CEA Board has elected Jack Dicks of Technical as its president for 1972. Serving with Mr. Dicks as vice president is Kitty Harbin of the General Counsel's Office. Jim Tallon of Finance and Administration holds the treasurer's post and Shirley Oliver of Operations is the secretary.

In addition to the officers' posts, other Board members will chair club committees. Bert Runfola of Finance & Administration and Dave Reiser of the Labs will share the duties as social chairmen. William Burch of the Labs and Dave Burks of Operations will share the duties as athletics chairmen. CEA special clubs and activities chairman will be Blaine Shatzer, of the Labs.

Will Cook, of Technical, walked away with first prize in the CEA-sponsored competition for the design of a COMSAT emblem. Jack Dicks presented Mr. Cook with his prize of \$50. Harriet Biddle of Management Review and Coordination took the second prize of \$25 with her entry. Third prize of \$10 was won by Bernard Mills of COMSAT Labs.

CEA is presently making arrangements to have the patches made and details will follow later on the purchase of these patches.

CEA would like to congratulate the winners and thank all employees who participated in the contest for their time and trouble.

The COMSAT Girls' basketball team, the "Long Shots," has finished in first place in League Six of the D. C. Recreation Department Girls' Basketball. These teams are made up of girls from both government and private industry.

The "Long Shots," having finished first in their league, will now play in the city championship to be held at a future date. Congratulations to the girls for a fine season!

■ Miss Oliver is a secretary in Operations.



The newly elected CEA Board of Directors includes (seated, left to right) Dave Burks, Blaine Shatzer, Kitty Harbin, Jack Dicks and Shirley Oliver. Standing (left to right) are Bill Burch, Dave Reiser and Jim Tallon.

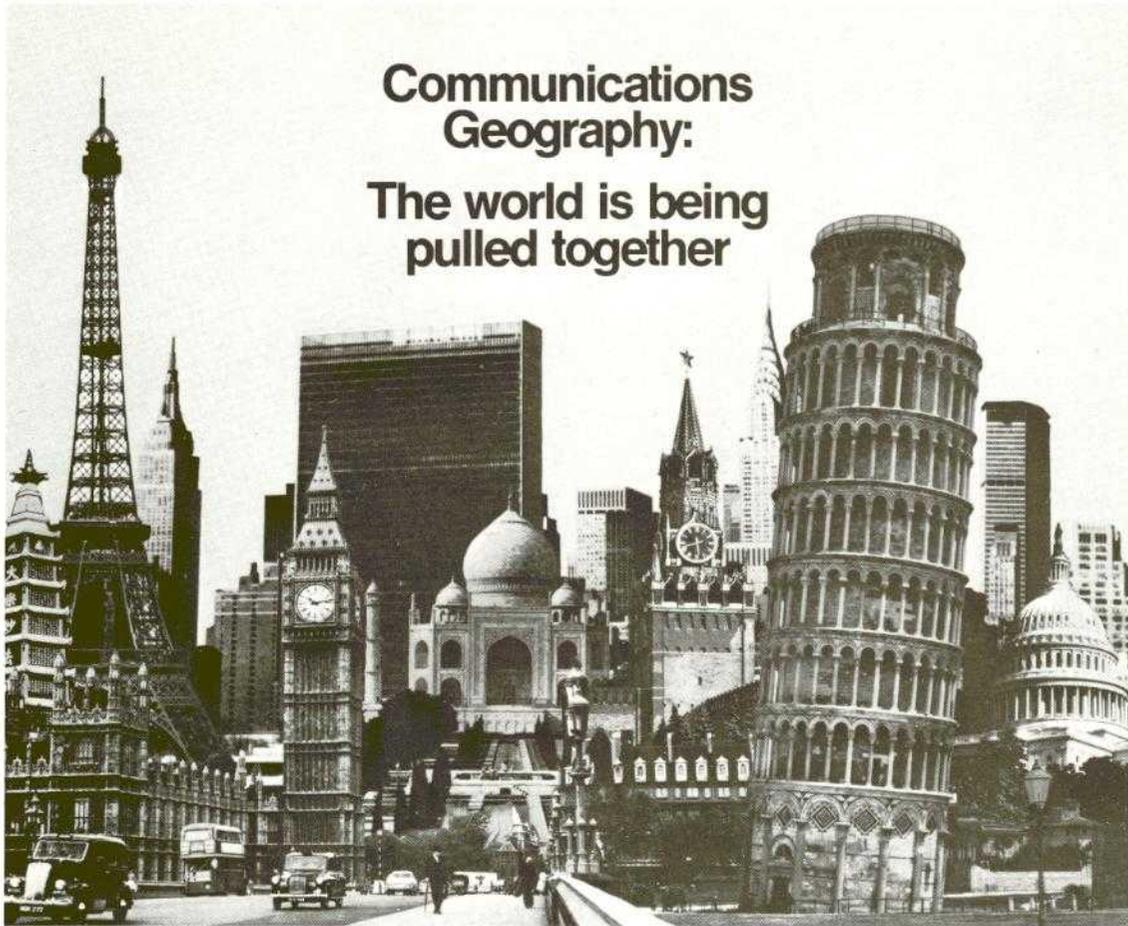


President Jack Dicks presents Will Cook, Technical, with his prize as winner in the CEA-sponsored emblem contest.

The winning COMSAT Employees Association (CEA) emblem design by Will Cook, Headquarters Technical staff, symbolizes global communications service by three synchronous satellites. The CEA will offer decals and pocket emblems based on Mr. Cook's design in the near future.



Shown below is one of a series of COMSAT's advertisements which are appearing in selected major newspapers.



Communications Geography: The world is being pulled together

Via Satellite

An artist's imagination? Not at all. This is how it really is.

Comsat is helping pull the world together...putting far-away places on the main street of business, industry and commerce...giving people a front row seat to history. Live via Satellite...pioneering new potentials for U. S. domestic as well as international telephone, tele-

vision, telegraph, data and facsimile communications.

Comsat, a communications company with 114,000 shareholders, operates the satellites in the global system... U.S. earth stations for satellite communications... the COMSAT Laboratories and a wide range of related technical activities that are creating new communications advances.

These are part of a world-wide satellite system to give you better communications.

More than 60 countries already communicate daily with each other via satellite.

In the United States, if it's via satellite, it's via Comsat.

Write to Comsat's Information Office for the booklet, "Via Satellite, The Comsat Story".

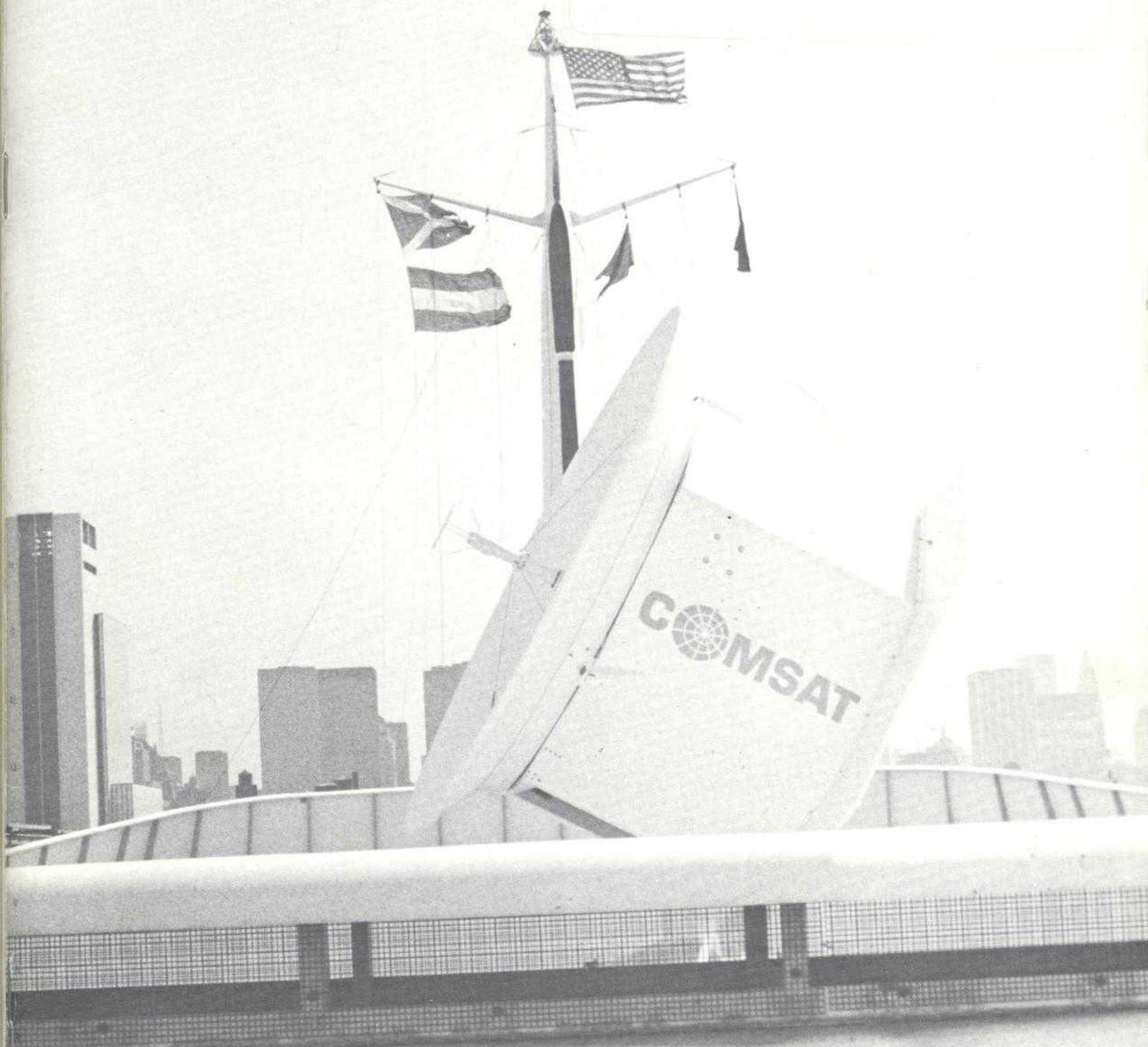
COMSAT
CAN TAKE YOU
PRACTICALLY ANYWHERE
IN MILLISECONDS



COMSAT

Communications Satellite Corporation
950 L'Enfant Plaza, S.W., Washington, D.C. 20024

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COMSAT
NEWS

June 1972

COMSAT NEWS

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On the Cover

A COMSAT small earth station rises against the New York skyline from the top deck of the QE2. In operation with an Atlantic IV satellite and an antenna at COMSAT Labs, the shipboard terminal was used for a series of demonstrations of ship to shore communications via satellite completed on May 15. *Photo by Allan Galfund.*

June 1972—7th Year, No. 3

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**Matthew Gordon, Assistant Vice
President for Public Information**
James H. Kilcoyne, Jr., Editor

COMSAT favors open entry for domestic services

In written and oral presentations, COMSAT strongly objected before the FCC to proposed Staff restrictions that it said would impede the speedy introduction of domestic satellite communications services.

COMSAT urged instead a policy of "genuine open entry."

The statements were in response to an FCC invitation for comments and arguments on Staff recommendations of the FCC's Common Carrier Bureau, made public March 17. Written statements by applicants for domestic satellite systems were submitted April 19, followed by oral arguments before the full Commission May 1 and 2.

In presenting oral arguments on May 2, COMSAT Vice President and General Counsel David Acheson argued that the Commission's policy should be one "... of genuinely open entry, which permits operators and users of satellite facilities to transact with the greatest freedom that is consistent with an economically healthy market."

He said a simple, direct approach could be adopted. "All qualified parties could be authorized," Mr. Acheson explained. "Why not merely require the parties, after authorization, but before going forward with

construction of facilities, to show a commitment, or some reasonably supported expectation, of traffic that would make the system viable?"

This would avoid, he said, "a fundamental defect of the Staff proposal, that of substituting the regulator's judgment for the market judgments of the parties concerned."

More than 25 different parties presented oral arguments. Earlier, in the written statements on April 19, COMSAT said:

"If open entry is to be the policy, we submit that it should be genuine open entry, not the limited entry, hedged with restrictions, that the Staff proposes.

"If a principal objective is to encourage applicants to enter a competitive race to build and launch systems and to attract business for such systems, the race ought to be a race in which quality, price and service will determine the winners. It ought not be a handicap in which some entrants are forced into arranged marriages while others are free to compete on their own, or in which special burdens and restrictions are placed on some of the contestants."

COMSAT vigorously opposed Staff recommendations that would force it to choose between leasing satellite capacity to AT&T, or serving the general public through a multipurpose system, as an "unfair and anti-competitive" restraint.

The issue was further emphasized by Mr. Acheson in his oral arguments. Among other things, he noted: "It is the buyer of service that would be hurt most by a rule arbitrarily limiting COMSAT to only one part of the domestic market, because it would sharply reduce the competition in the rest of the market from which we are excluded . . . It cannot help but reduce competition. It might make a more comfortable environment for our competitors, but it would do this at the customers' expense."

The Corporation also objected to recommendations that it be prevented from having stations in Alaska, Hawaii and Puerto Rico, which would restrict its operations to the continental 48 states. This could severely diminish its ability to compete with other systems not burdened with the



Mr. Acheson

same restrictions, COMSAT said.

The April 19 filing said that, in sum, "COMSAT believes that the Commission's first priority should be the rapid inauguration of the long-awaited domestic satellite system . . .

"In lieu of the Staff's complicated and repressive proposal, we have suggested a truly open-entry approach, subject only to a single and relatively simple condition based on anticipated traffic."

ANPA favors COMSAT proposal

The American Newspaper Publishers Association recently stated in comments submitted to the FCC that it "favors a multipurpose domestic satellite system."

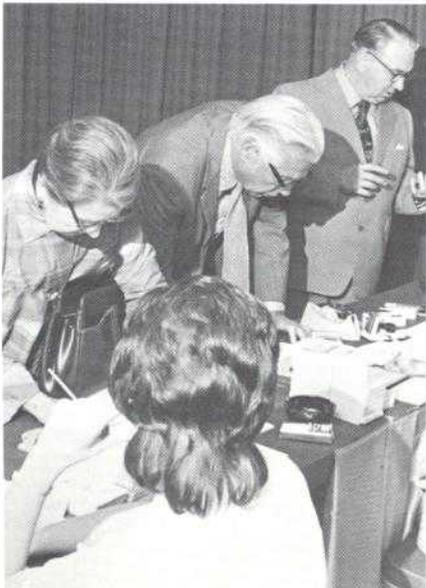
The ANPA also said that since satellite communications costs are not related to distance a multipurpose system could "facilitate a wider dissemination of news and pictures and introduce new and innovative techniques for improving and extending the current methods of collecting and distributing news matter."

Also, it said, the COMSAT proposal "offers the best prospect for improved and expanded service to the press."



Ninth annual meeting

Approximately 100 COMSAT shareholders and their guests attended the Ninth Annual Meeting on May 9 in the American Film Institute Theatre, L'Enfant Plaza. Shown here are some scenes of the meeting, including shareholders and employees on duty for the meeting.



The Chairman's statement to shareholders

■ *Following is the substance of the statement of Joseph H. McConnell, Chairman of the Board of Directors, at the Annual Shareholders Meeting on May 9.*

As we look forward this afternoon, we might appropriately look backward for perspective. The year 1971 marked our first five full years of commercial operation. We have faced many difficult problems and challenges. COMSAT was created by the Congress to specialize in and develop satellite communications, our only business. We have established an international system serving more than 60 countries far more promptly and effectively than anyone thought possible when we started. Congress did not create us to stand still or hold back. We have moved forward rapidly and effectively.

Since Early Bird, launched essentially as an experimental operational satellite, we have played a major role in changing the face of world communications. The International Telecommunications Satellite Consortium is the vehicle by which these communications advances were achieved. And, it now appears that the Interim Agreements, under which we fulfilled in large measure the aspirations of the Communications Satellite Act of 1962, may be superseded before our next meeting by the Definitive Arrangements negotiated last May 21 by the 80 members of INTELSAT at that time.

To enter into force, ratification is required by two-thirds or 54 of the 80 members who also hold two-thirds of the investment quotas. At the present time, some 30 governments and their communications entities (including the United States and COMSAT) have ratified or completed action on the agreements.

We believe that these agreements, when adopted, will give permanence to the firm foundation that has been constructed since INTELSAT was

formed in 1964, and that they will serve as a springboard for further expansion and diversification of satellite services to the people of the world.

You are well aware that the domestic satellite issue has now been pending before the Federal Communications Commission for some years. During that time, national policy proposals have ranged from selecting COMSAT as the chosen instrument for the program, to opening the skies to all comers, subject only to technical and financial capability. In this instance, the applicants all represent private enterprise. Important hearings on this matter were held by the Commission on May 1 and 2. In this proceeding, we stated our preference for an open entry policy, essentially without limitation, which would permit competition based on quality, price and service. We took issue with a Staff recommendation which would restrict our ability to serve the domestic market and, we believe, the public interest.

You also know that we have proposed aeronautical satellite services on four



Mr. McConnell

different occasions in recent years. In this instance, we may be facing competition from some government entities, contrary to policy guidelines established earlier by the government itself. We are opposed to government entry into commercial satellite communications. We hope that this issue will be resolved in a prudent manner.

From last year's annual report, you know that operating revenues for 1971 were 27 percent above the previous year on an increase of 19 percent in the number of circuits leased to our customers. This resulted in an increase of 30 percent in net income from operations and investments.

Thus, in recognition of the Corporation's current level of earnings, the Board of Directors at its April meeting increased the seventh quarterly dividend to 14 cents per share from 12½ cents per share. This increased dividend is at the maximum allowable rate under the current guidelines established by the President's Committee on Interest and Dividends.

At the same time, we announced financial results for the first quarter of this year. Operating revenues for this period reached a record \$25 million, but net income was two cents per share below the first quarter a year ago, primarily because of lower earnings on our portfolio of temporary cash investments.

Although there was essentially no change in the volume of our business during the first three months of this year, we have projected a traffic growth for 1972, perhaps on the order of 20 to 25 percent.

In closing, I would like to re-emphasize our demonstrated qualifications to serve the domestic and aeronautical, as well as the maritime communications requirements of the United States. Today, at our ninth annual meeting, we have a record of remarkable accomplishment already behind us . . . we have a uniquely talented staff . . . we are reaching financial maturity . . . and we have built a solid structure of human and financial resources.

I do not believe that we can fairly be denied opportunity to serve the public interest in the future. We have served it well in the past.

The President's statement to shareholders

■ *Following are excerpts from the statement of Dr. Joseph V. Charyk, COMSAT President, at the Annual Shareholders Meeting on May 9.*

Since our last meeting, we have successfully launched two more satellites in the INTELSAT IV series which are establishing an improved global satellite system of significantly higher capacity and capability.

One was emplaced over the Atlantic Ocean to give us the second operating IV in that area. These two IVs represent well over 10,000 circuits of capacity, more than enough to meet all communications requirements between the United States and Canada, Europe, Latin America, Africa and the Middle East well into the 1970s.

The other INTELSAT IV satellite was, as you may recall, placed in commercial operation over the Pacific Ocean during the week preceding the President's visit to the People's Republic of China. This satellite, connecting our Jamesburg Earth Station with a transportable station at the Peking Airport, enabled China, for one brief week, to become a focal point of world attention. This satellite link also provided telephone, teletype, photo and press message services.

China is among the ten additional countries that either have constructed, or are expected to construct some 17 new antennas during 1972. This would bring the worldwide network of earth stations by the end of this year to some 80 antennas at 64 earth station sites in 49 countries of the world.

COMSAT is leasing more than 2500 half circuits on a full time basis, or approximately 41 percent of all satellite communications of the world. This is a substantial volume of business when one considers that on the order of two-thirds of all the long distance international telecommunications traffic now goes via satellite.

We are also striving to achieve the redundancy, or backup, in both our satellite and earth station facilities that is required to have a fully reliable system.

In the satellite system, we have sufficient redundancy in the Atlantic area at the present time with the two IVs operating there. A third IV is planned as a spare in orbit as traffic builds up in that area. We have a III and IV in the Pacific, with either capable of handling all traffic at this time. We have some concern as to the effective operational lifetime of the III, and also its diminishing capability to serve as a spare capable of restoring all Pacific area traffic. Accordingly, a second IV is planned for that area as a spare in orbit. The IV planned for launch next month is scheduled as the operational satellite for the Indian Ocean area with one of the IIIs there presently serving as the spare in orbit. The Indian Ocean IV will provide global coverage utilizing the INTELSAT IV series of satellites.

On the ground, however, we have encountered a procedural roadblock. We need second antennas at the Andover and Etam stations, and some additional electronics at Brewster to achieve a complete restoration of service capability between the Brewster/Jamesburg and Etam/Andover stations. Accordingly, we asked the Commission some time ago for authority to install the necessary facilities.

It is ironic that our application to the FCC for authority to construct the necessary facilities, although supported by AT&T, is being opposed by the record carriers who, at the same time, are advocating the construction of other communications facilities in the name of redundancy and flexibility. This is being done despite the fact the FCC has permitted the record carriers to have an ownership interest in satellite earth station facilities under the premise that this would provide these carriers an incentive to use the satellite system, and provide a motivation to work for the improvement of service through facilities in terms of quality, reliability and efficiency. We hope the FCC will re-examine, in the light of this picture, the validity of the premise.



Dr. Charyk

Under present FCC policies, we are permitted to make our services available only to authorized users. Nevertheless, we do have a mandate under the Communications Satellite Act of 1962 to conduct the kind of research and development work that will advance communications satellite technology. Some of this work is going forward in our Laboratories, and some of it in field tests to determine the commercial feasibility of new communications advances.

As part of our work on the development of small earth station terminals, while still maintaining high quality transmission, we recently undertook a two-month experiment in cooperation with the Cunard Lines. The experiment includes ship to shore communications tests between a COMSAT-designed 8-foot antenna on the deck of the Queen Elizabeth 2, and a 15-foot antenna at the COMSAT Laboratories. These terminals are working with an Atlantic INTELSAT IV. This is the first time that voice, data, facsimile and computer remote access communications have been carried on via satellite with a commercial liner at sea. In addition to providing us with valuable maritime communications experience,

these tests will also give us the kind of information we need to successfully design and develop moderately priced ship terminal equipment.

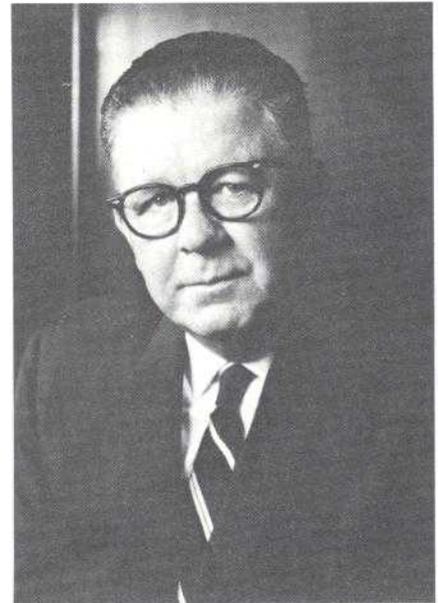
In another small-station experiment, COMSAT and the State of Alaska, are evaluating the feasibility of serving remote Alaskan communities via satellite. The demonstrations include direct television and two way voice communications via Pacific satellite to six locations: Juneau, Kodiak, Bethel, Nome, Barrow and Fort Yukon. A small COMSAT-designed transportable earth station with a 16-foot antenna is being air-shipped and erected successively at each of the six locations. COMSAT's large permanent Bartlett Earth Station at Talkeetna, equipped with a 97-foot antenna, is the "anchor" station for the demonstrations. The Governor of Alaska requested and helped arrange the demonstration program, while the Alaska Educational Broadcasting Commission is arranging the TV programming.

We have been studying the kind of satellites that might follow the present 5000 circuit INTELSAT IV series, and recently awarded two major study contracts for this purpose. Within the range of possibilities being considered, a derivative INTELSAT IV could provide perhaps twice the capacity of the present series. A completely new fifth generation satellite could provide many times the capacity of the present series.

In a business such as ours, where technology is advancing so rapidly, the future is, in many respects, right now. The greater challenge, I believe, lies in finding ways to overcome the non-technical obstacles which stand in the way of permitting a full realization of the opportunities for better communications services that satellites offer. We will continue to tackle these obstacles in order to hasten the day when practical demonstration and realization will bear a much closer relationship to the potential which this exciting technology affords.



Mr. Meany



Mr. Fitzsimmons

Shareholders elect twelve directors

COMSAT shareholders elected 12 directors at their annual meeting on May 9, nine by Series I (public) shareholders and three by Series II (communications common carrier) shareholders.

The nine incumbents reelected as Series I directors were:

- Philip W. Buchen
- Joseph V. Charyk
- Gordon Edwards
- William W. Hagerty
- George L. Killion
- Joseph H. McConnell
- James McCormack
- Bruce G. Sundlun
- Leo D. Welch

The three incumbents reelected as Series II directors were:

- James E. Dingman
- Richard R. Hough
- Horace P. Moulton

In addition, COMSAT's Board has three other members who are appointed to three-year terms by the President of the U.S. with the advice and consent of the Senate. They and the years in which their terms expire are:

- Frederic G. Donner (1974)
- George Meany (1972)
- Rudolph A. Peterson (1973)

Fitzsimmons named to succeed Meany on COMSAT board

President Nixon has named Frank E. Fitzsimmons, General President of the International Brotherhood of Teamsters, as one of the three Presidentially-appointed members of the COMSAT Board of Directors. The appointment for a term which would expire in 1975 is subject to Senate confirmation.

Mr. Fitzsimmons would succeed George Meany, President of the AFL-CIO, who informed Mr. Nixon that he did not wish to be considered for another term on the board.

In a letter to the President on February 11, Mr. Meany stated that "for a variety of personal reasons, I am trying to reduce the demands of my outside activities and, accordingly, want you to know that I do not wish to be considered for further service as a director of COMSAT."

In his letter, Mr. Meany recalled that he had served as a COMSAT director since September 1964. He was first appointed by President Johnson to a two-year term, reappointed by Mr. Johnson in 1966 to a three-year term, and reappointed by Mr. Nixon in 1969 to a three-year term.

"I should like to take this opportunity," Mr. Meany told the Presi-

dent, "to say that my experience on COMSAT's Board of Directors has been a valued privilege and a source of the deepest satisfaction to me, for which I am grateful to you, as to your predecessor.

Mr. Meany urges Government policy support for COMSAT aeronautical and domestic services.

"These have been the formative years of COMSAT and of the global communications satellite system it was charged with establishing, which has proven to be such an astounding success, owing chiefly to the energetic and far-sighted management of COMSAT.

"As I contemplate my retirement from the Board of this extraordinary Corporation, I want to express the hope that the Government will, in its policy-making, give staunch support to the Corporation as it endeavors to expand its services to new areas such as aeronautical communications and domestic communications via satellite, to the end that COMSAT's role and potential can be enhanced and fulfilled."

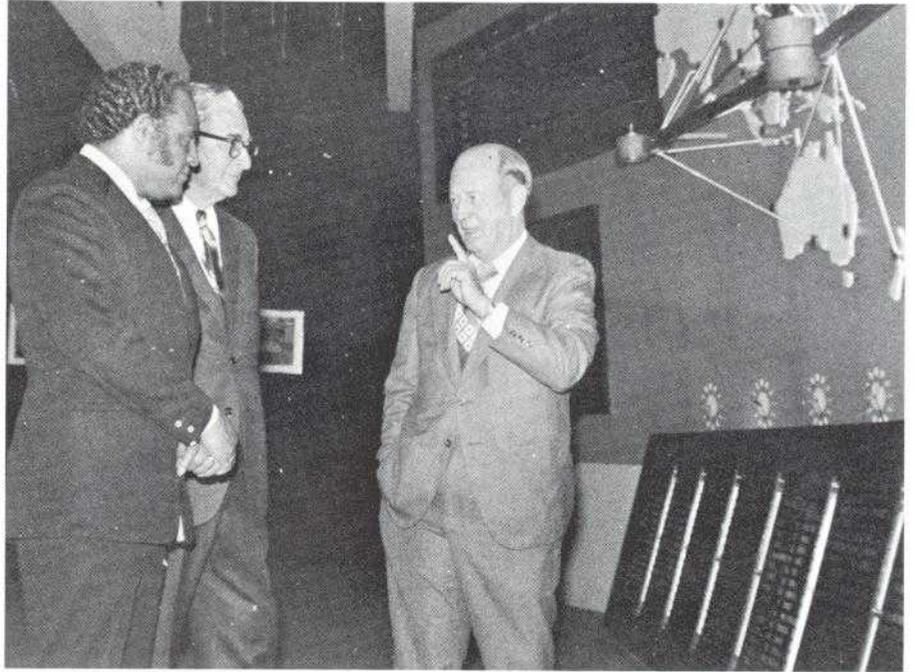
President Nixon thanks Mr. Meany for helping make COMSAT an 'outstanding success.'

In a reply to Mr. Meany, the President said:

"I will, of course, respect your wish that you not be reappointed to the Board. . . . In doing so, I want to thank you for the dedicated service you have given COMSAT since 1964, helping to make this unique public organization the outstanding success that it is."

Mr. Fitzsimmons is a veteran of the labor movement who worked his way up from the rank and file of the Teamster organization to president.

He was born in Jeannette, Pa., in 1908 and moved to Detroit when he was 16. At the age of 18 he became a dockman in Detroit and later became an over-the-road truck driver in the Midwest.



Commissioner briefed on global system

Judge Benjamin L. Hooks (left), newly appointed FCC Commissioner, is briefed by Lawrence W. Covert (right), manager, Operations Center, as Gustave J. Rauschenbach, Director of Congressional Relations and Corporate Development, listens.

He entered the labor movement as an official in 1937 when he became business agent of Teamster Local 299 in Detroit. He served subsequently as vice president of Local 229, secretary-treasurer of the Michigan Conference of Teamsters and vice president of Teamster Joint Council 43 in Detroit. For many years he was active in the Central States Drivers Council.

In 1961 he was appointed International Union vice president. He became general vice president of the Teamsters Union in 1966 and was elected General President in 1971.

Mr. Fitzsimmons and his wife, Pat, have three sons and a daughter and live in Bethesda, Md.

COMSAT staffer participates in novel seminar

✓ Louis B. Early, Assistant for Policy Development, Corporate Relations, recently sat in his L'Enfant Plaza office and discussed "The Growing Use of Satellites in Education" with a group of college students in Ames, Iowa.

At the invitation of Professor George P. Wilson, Director of Telecommunicative Arts at Iowa State University, Mr. Early participated in the unique long distance seminar that combined the use of 35 mm color slides being shown in the university classroom and an amplified two-way telephone connection.

He talked with approximately 100 speech majors from his office for the better part of an hour as the students viewed a selection of slides highlighting a variety of satellite applications. The slides, adapted from a COMSAT Information Office presentation, were sent to the university beforehand.

Global system provides vital Apollo 16 links

By JOHN J. PETERSON

At 98 hours and 15 minutes Ground Elapsed Time, GET, on Wednesday, April 19, Astronaut Ken Mattingly reported trouble aboard the Command Module "Casper." The Lunar Module "Orion," carrying Astronauts John Young and Charlie Duke, was scheduled to land on the moon 32 minutes later—at precisely 98.47 GET.

Solving the problem and making the decision to proceed with the lunar landing in the 16th revolution around the moon rather than the previously planned 13th revolution, took just enough time to affect the entire flight schedule and attested to the communications capability of the Houston Manned Spacecraft Center, the NASA Communications Network and COMSAT Operations.

Initially, only televised reports of the lunar liftoff and the transearth space retrieval of film totaling one hour and 34 minutes were to be carried back to Houston, Texas, via the earth station in Madrid, an Atlantic Ocean INTELSAT IV and the Etam, West Virginia Earth Station.

■ *Mr. Peterson is a COMSAT information officer.*

The delay of almost six and one-half hours in lunar touchdown, however, required the Madrid earth station to assume responsibility for returning more than 60 percent of the TV transmission to the United States rather than the less than 10 percent originally scheduled. The earth stations at Madrid and Etam, using an Atlantic INTELSAT IV, became the principal conduits of TV transmissions for Apollo 16.

According to the final flight plan, approximately one hour and a half of TV transmissions were to be carried via an Atlantic INTELSAT IV. With the concluding coverage of the in-space press conference on April 26, from the crew rocketing back toward earth, the Madrid-satellite-Etam-Houston channel had carried 14 hours and 47 minutes of televised coverage.

Beginning on April 22, Madrid received and returned to the U.S. five hours and 15 minutes of EVA 1 (Extra Vehicular Activity); April 23, six hours and three minutes of EVA 2; April 25, two hours and 37 minutes

Via satellite, a constant stream of essential voice and data communications poured into Houston.

of transearth EVA (the film retrieval in space); and on April 26, 52 minutes of space press conference with the astronaut crew. Because of time changes in the flight schedule, the lunar liftoff previously planned to be routed through Madrid was received in Goldstone, California.

Commercial distribution of Apollo 16 television to overseas locations and within the United States fell only five hours short of the Apollo 15 totals of transmit and receive time over the global network. Apollo 15 ranked second to Apollo 11 in satellite usage for an Apollo flight.

According to Russon L. Poulsen, analysis manager in Operations, INTELSAT IV satellites transmitted 64 hours and 27 minutes of live coverage while earth stations of the global system received 100 hours and eight minutes.

The United States led with receive time totaling 24 hours and 59 minutes, followed in order by the United Kingdom with 20 hours and 49 minutes, France with 13 hours and 26 minutes, and Iran with 12 hours and 12 minutes.

INTELSAT IV satellites transmitted more than 64 hours of live coverage and earth station receive time exceeded 100 hours.

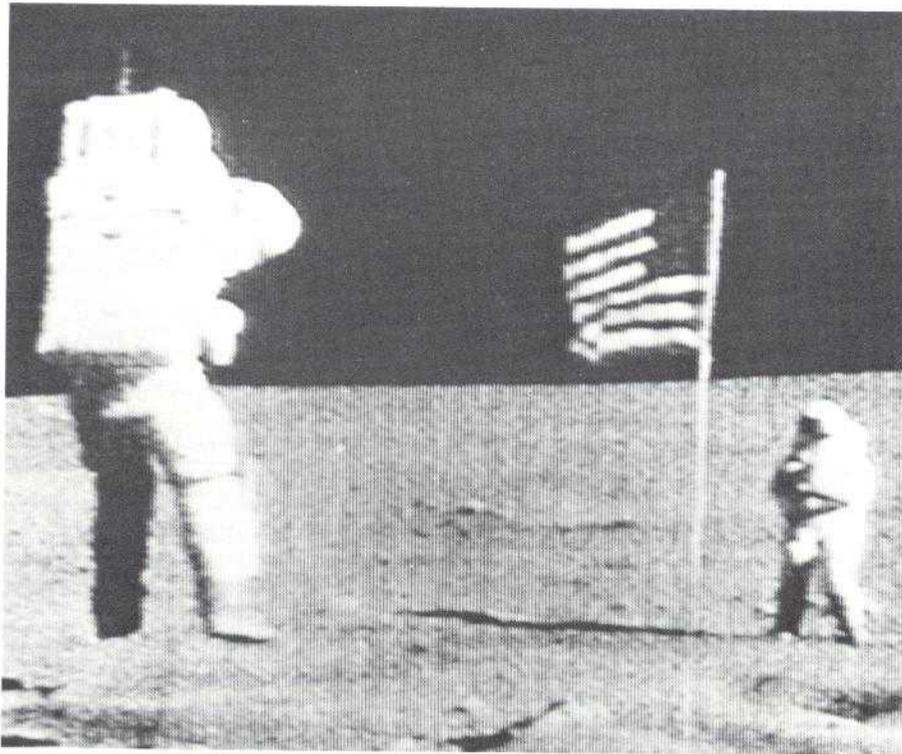
Other countries receiving televised portions of the mission included Argentina, Australia, Brazil, Colombia, Italy, Japan, Jordan, Venezuela and the Zaire Republic.

From Houston the European Broadcasting Union fed 129 hours and 20 minutes of audio coverage overseas, the major portion of which was carried with televised reports live from foreign correspondents at the Manned Spacecraft Center. The principal receivers of the audio transmissions were Germany, Spain and Italy.

The "leaping into the breach" by a segment of the global system represented only the more glamorous aspects of mission coverage, that dealing with television. With much less notoriety, the big "dishes" in Spain and Australia, aided by the NASA Goldstone antenna, continued to return to Houston the constant stream of voice and data transmissions essential to any mission, particularly one plagued by minor problems.

On Sunday evening, the first day of flight, the crew and ground controllers were puzzled by paint flaking from the lunar module, connected nose to nose with the mother ship in translunar trajectory. As the flight progressed, troubles were encountered with the guidance and navigation system locking the spacecraft in fixed flight for a short period of time. An inoperable antenna affecting communications with Mission Control and a balky zipper on Duke's pressure suit added to the problems, any of which could have brought the flight of Apollo 16 to an early end.

These were minor problems, however, and the technical experience of the engineers on the ground and the



This picture of Astronaut Young (left), saluting the flag as Astronaut Duke takes his picture, traveled from the moon over the Atlantic IV, via Etam to Houston.

proficiency of the crew enabled solutions to be found for each.

The major problem developed shortly before the lunar module was to begin its powered descent to the lunar surface when the command module Casper developed trouble with its main engine. Again, experienced and knowledgeable men on the ground at the Houston Manned Spacecraft Center, in the air, and in a nationwide network of supporting industrial complexes, were able to develop solutions enabling the mission to continue.

In the background the Big Brothers

of the Deep Space Network, the large antennas in California, Spain and Australia, unceasingly monitored the spacecraft and their occupants and relayed the necessary commands to Casper and Orion with approximately two-thirds of the voice and data communications carried over the Atlantic and Pacific Ocean satellites and the earth stations in Spain, Etam, and Jamesburg.

During the 12-day flight, only when the astronauts were behind the moon for a period of about three-quarters of an hour during each two-hour rev-

A worldwide audience viewed the liftoff of Orion from the moon's surface.



olution, were they alone and unreachable by any means.

Charles Busch of MSC's Flight Support Division, interviewed in Houston, stated, "all the preplanning and procedures adopted during previous flights for TV transmissions went out the window during Apollo 16. Just like everybody else, we went real time, adjusting to the different situations as we went along.

"The best we could do was to take one event at a time and order up circuits as we needed them, giving ourselves a 30-minute lead time to insure our communications were good and some follow-up time. The mission planning and control people put out a 'scratch sheet' prior to each activity spelling out the revised requirements. Initially we got this over closed circuit TV followed by a mimeographed version. The punch line on each of the scratch sheets was 'look for more news on Channel 61.' Channel 61 is the MSC closed circuit TV channel."

Busch remembered writing approximately 30 additional messages and making over 100 additional telephone calls in order to meet the required circuit changes. "Going real time," he said, "meant going around many of the normal channels and dealing with the people having the direct input. The support we received from COMSAT in arranging for circuit availability was tremendous. Their operations were in the same boat we were in, adjusting at no loss to us to a schedule often being revised hourly."

Larry Covert, operations center manager, and his people look upon Apollo 16 communications support as more complicated than support for the President's trip to China from an on-going operational standpoint. "With the China trip," said Covert, "I could get on the phone daily with George Lawler, our marketing director, in Peking and arrange for that day or the next day's traffic. But this was not the case with Apollo 16. Whereas, normally for an Apollo mission, we have a well-laid-on program prearranged among the carrier, users and ourselves, this time most of the scheduling was done over a conference line between the Manned Spacecraft Center, the carrier and our operations."

COMSAT proposes reduced tariff to Hawaii

COMSAT recently filed an experimental tariff, offering to cut rates substantially on voice-grade circuits between the U.S. Mainland and Hawaii.

The proposals, filed with the Federal Communications Commission (FCC), were announced by George P. Sampson, COMSAT Vice President, Operations, at the Governor's Conference on Telecommunications in Honolulu.

As an initial step, COMSAT proposed to reduce its rate for leased half circuits to \$2500 a month from \$2700. This 7.4 percent reduction would be effective June 3.

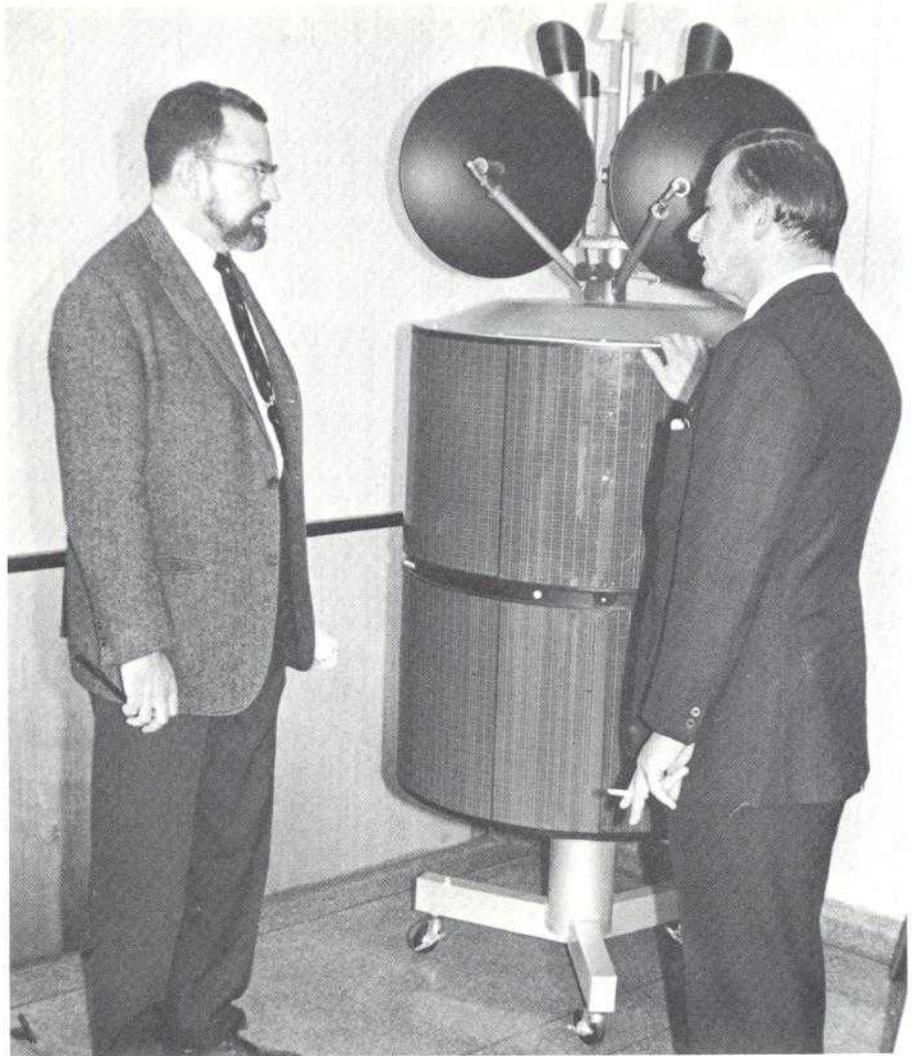
In addition, and more significantly, the Corporation proposed a unique charging concept, offering to cut its rates to \$1000 a month from \$2500 on new traffic leased by carriers above a certain base amount.

The experimental rate of \$1000 per month would apply to all circuits leased by COMSAT customers which exceed by more than 10 percent the number being leased by that customer as of April 18, 1972. Thus, this lower charge would apply to new or growth traffic.

The Corporation proposed that the experiment continue for about a two-year period, or until June 30, 1974.

In a letter to Bernard Strassburg, Chief of the FCC Common Carrier Bureau, Dr. Joseph V. Charyk, COMSAT President, said: "The crux of the experiment, of course, will be to test the elasticity of the market in response to price, and to ascertain the extent to which very low rates could be justified by a high traffic growth rate."

The \$200 per month proposed reduction would apply across-the-board to all presently leased half circuits. The experimental rate of \$1000 per month on new traffic, however, is designed to determine market potentials. At the end of the two-year experiment, either a provisional rate reflecting an average rate for all leased channels, or some other rate indicated by preliminary results of the experiment, would be put into effect.



Zoo director briefed on satellites

George Lawler, COMSAT Director of Marketing, explains the workings of an INTELSAT IV satellite to Dr. Theodore Reed, Director of the National Zoo in Washington, D. C. Dr. Reed visited COMSAT to discuss the Peking Zoo, which Mr. Lawler visited when in China. Later Dr. Reed went to China to accept a pair of panda bears as a gift to the United States from the People's Republic of China.

"While we must emphasize the experimental and temporary nature of the tariff," Dr. Charyk wrote, "nevertheless we are hopeful that this program will yield results that will serve the public and make a major step forward in serving off-shore domestic points."

COMSAT placed into effect on July 1 last year a major rate cut of 25 percent for certain Atlantic area satellite services. This reduction amounted to savings of more than \$5 million to the carriers during the last half of 1971.

Lockheed studies early version V

Lockheed Missiles and Space Company, Sunnyvale, California, is working on a system design study for an "early version" INTELSAT V satellite. The \$250,000 study contract, to be completed within approximately six months, was awarded by COMSAT on behalf of INTELSAT.

The purpose of the contract is to provide a study of the design of an INTELSAT V which could be introduced into operational service by early 1976.

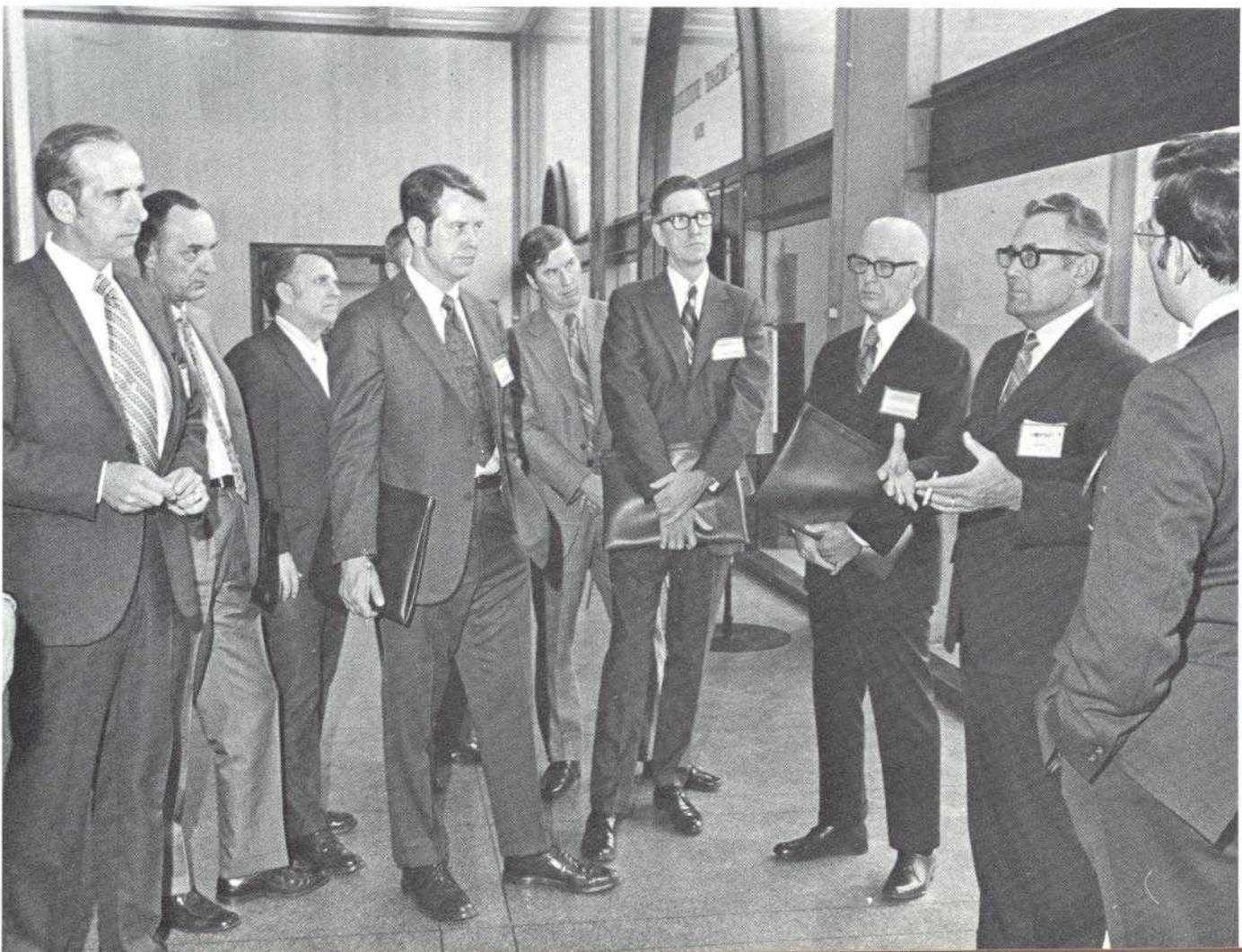


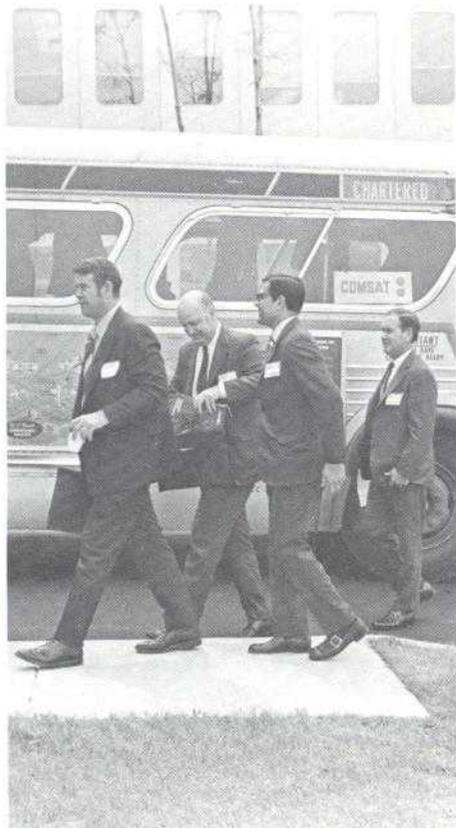
Industrial symposium attracts national group

Addresses by Corporation President Joseph V. Charyk and Bernard Strassburg, Chief of the FCC Common Carrier Bureau, highlighted COMSAT's successful spring Industrial Symposium.

Held at the Marriott Key Bridge Hotel in Arlington, Virginia, the conference included a series of presentations emphasizing the unique capabilities of satellite communications.

Included in the two-day meeting were tests and demonstrations using typical terminal equipment interconnected via satellite as well as a complete tour of the COMSAT Laboratories and a visit to the Operations Center.





Radio amateurs develop satellites for worldwide use

BY PERRY I. KLEIN

The sixth in the series of OSCAR amateur radio satellites is now nearing completion for launch with the NASA meteorological satellite later this year.

This article is adapted from a paper presented by the author at the AIAA 4th Communications Satellite Systems Conference.

OSCAR (Orbiting Satellites Carrying Amateur Radio) satellites are small communications spacecraft designed for worldwide use with low-cost terminals in the amateur service. These satellites are constructed by radio amateurs for launch into low or medium-altitude polar orbits on a space-available basis as "piggyback" payloads with other missions.

Since December 12, 1961, five satellites of the OSCAR series have been launched by the U.S. Air Force and NASA, and all have functioned successfully. Two satellites, OSCAR 3 and 4, contained communications repeaters, while the other three carried simple telemetry beacons. These satellites had useful operating lifetimes of no more than several months. The last OSCAR, Australis-OSCAR 5, was launched in January 1970 with TIROS-M and operated for six weeks.

The AMSAT-OSCAR-B (A-O-B) series of radio amateur satellites now under development represents a second generation of OSCAR spacecraft. These are solar-powered communications satellites designed for operating lifetimes of a year or more. With lifetimes of this order, it is possible to design user-experiments to take advantage of the communications capabilities of these spacecraft. In particular, the use of VHF and HF repeater

■ *Dr. Klein is a member of the communications processing lab staff at COMSAT Laboratories. He is also president of AMSAT, the radio amateur satellite group developing the satellites described in this article.*



Jan King (left), NASA Amateur Radio Club, holds Australis-OSCAR 5 as Dr. Klein looks on.

frequencies and low or medium altitude orbits makes possible the use of reasonably simple, inexpensive equipment on the ground.

Several subsystems have been developed for this series of missions. A linear communications repeater has been designed and fabricated by radio amateurs at the University of Marburg in West Germany. This device can be used by up to 20 single-sideband telephony stations transmitting simultaneously. Single-sideband voice transmission appears to be the most efficient modulation mode for use of the limited repeater output power (10 watts), although Morse code (CW), AM and FM can also be used with less efficiency.

A second linear repeater has been developed by members of the COMSAT Amateur Radio Club, with the assistance of radio amateurs at NASA. This repeater is expected to produce ground signal levels sufficient to be received on standard short-wave receivers using simple antennas. A breadboard of this repeater was flown aboard several small aircraft in two series of tests over the East and West coasts of the U.S. last year. Like the German repeater, the device op-

erates most efficiently with single-sideband voice and CW Morse code transmissions.

A third repeater, under development by a group of radio amateurs in Melbourne, Australia, is a channelized, hard-limiting unit designed to relay amateur FM transmissions. This repeater will transmit in the new 435-438 MHz segment of the 70-cm band allocated to the amateur satellite service at the recent ITU World Administrative Radio Conference (Space).

Each repeater contains a beacon which carries satellite "housekeeping" telemetry information. Two telemetry systems have been developed for these missions. The amateur group at the University of Melbourne in Australia has developed a 60-channel telemetry encoder designed to transmit satellite parameters in teletype format, for printout on standard teleprinters commonly used by radio amateurs. A second type of telemetry encoder, devised and built by a chemist in Texas, encodes and transmits 24 spacecraft parameters as numbers in Morse code, so that only pencil, paper, calibration information and a basic facility with the code are needed for reception and interpretation of data from the satellite.

A Morse code and teletype message storage unit called "CODESTORE" has also been developed for store-and-forward communications applications.

It is expected that amateur satellites will contribute to the advancement of educational training both domestically and abroad. In some of the smaller developing countries that are not yet members of INTELSAT, the establishment of an OSCAR ground station may represent the first direct experience with satellite communications. A reasonably good station can be set up for less than \$1000.

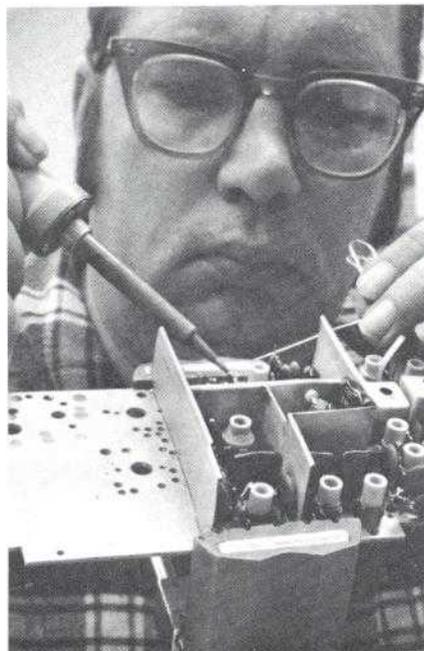
Previous OSCAR missions have been used in schools for group and individual training of various types. For example, at the Talcott Mountain Science Center for Student Involvement in Avon, Conn., over 300 students were introduced to the concepts and methods of satellite tracking using real-time passes of Australis-OSCAR 5. Students were able to determine the passage times and directions of the satellite, receive and interpret telemetry data, and operate a tracking station themselves using an amateur station installed for this purpose at the school.

In the 1971 fall term, a graduate workshop on amateur satellites was conducted by the University of Hartford College of Education to develop curricula on the use of amateur satellites in the classroom. The workshop established lesson units in the following areas:

- **Physics—Doppler effect, orbital mechanics, and wave propagation**
- **Communications**
- **Mathematics in Space**
- **Social Science—people to people communication**
- **Space Science**

The OSCAR satellites now under construction are designed for operation in low, circular orbits at altitudes of about 900 miles. Unlike INTELSAT, NASA or military communications satellites, which are generally placed in synchronous orbit, the planned missions will explore the potentials of low, non-synchronous orbits for small terminal communication applications for which continuous, full-time communication may not be required.

"Bush" or "out-back" communications, such as might be found in Alaska, northern Canada, Australia, Antarctica or the developing countries, are analogous in some respects to amateur communications anywhere in the world. Many radio amateurs regularly use small portable HF and VHF transmitters and receivers,



Wally Mercer, of the COMSAT Amateur Radio Club, assembles a repeater unit for an OSCAR.

equipment installed in vehicles, and hand-held transceivers. Amateur satellites can provide long-distance VHF and HF communications, especially needed during nighttime or other periods when long-distance ionospheric communication at HF is unreliable.

Radio amateurs on numerous occasions have provided the only means of communications in the time of emergency. The earthquakes in Alaska (1964) and Peru (1970) are two examples, and members of the COMSAT Amateur Radio Club offered their assistance after the California earthquake last year.

In setting forth the very basis and purpose of the amateur service, the Federal Communications Commission cites the value of the amateur service, particularly with respect to providing emergency communications. The use of satellites for assistance during emergencies and natural disasters has

also recently become a subject of study by the International Telecommunication Union. It is expected that future OSCAR satellites will be available in support of such emergency communications as a backup for HF radio, which is highly dependent upon suitable ionospheric conditions.

Another application planned for future satellites is the exchange of medical data. Cases have been documented in which radio amateurs were used to locate needed drugs, communicate diagnosis of a rare disease or relay medical instructions during surgery. OSCAR spacecraft will be capable of relaying such communications. In addition, tests are being arranged by members of the National Institutes of Health Amateur Radio Club to transmit electrocardiograms from isolated areas to medical centers for diagnosis as a demonstration of this space application.

Still other experiments are planned for real-time computer data transmission. One proposed experiment is to transmit to a time-shared computer from a remote terminal, using an OSCAR satellite to relay the transmissions.

This article has described the design and intended applications of the next series of OSCAR radio amateur satellites. Several communications repeaters, telemetry systems and a store-and-forward message storage unit have been developed for these spacecraft. These systems are intended for use by radio amateurs without requiring highly sophisticated ground station equipment.

The satellites are planned to function as educational tools for training in schools. In addition, low-orbit communications experiments are planned to demonstrate the usefulness of small satellites for "bush" and emergency communications, medical data exchange, store-and-forward message applications, and propagation studies. Although these experiments will be conducted within the amateur service, it is certainly expected that some of the experience and knowledge gained with these satellites will be applicable to future satellites in other services as well.

Echo canceller demonstrated at AIAA conference

A COMSAT echo control technique was demonstrated at the 4th Communications Satellite Systems Conference of the American Institute of Aeronautics and Astronautics in Washington, D. C. The demonstration employed an echo canceller designed and built by engineers at COMSAT Laboratories and an INTELSAT IV satellite circuit.

Wilbur L. Pritchard, Assistant Vice President and Director of the COMSAT Laboratories, was general chairman of the conference.

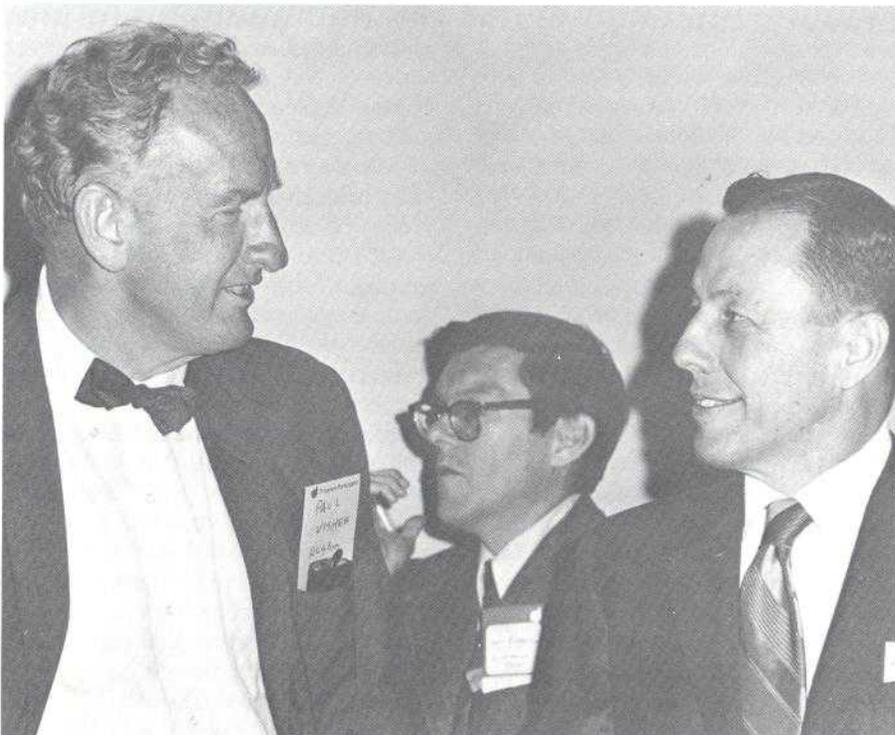
Dr. Joseph V. Charyk, COMSAT President, addressed the delegates at a luncheon. In addition, John L. Martin, Jr., Assistant Vice President for Domestic and Aeronautical Satellite Systems, participated in a panel discussion on domestic satellite systems with Bernard Strassburg, Chief of the Common Carrier Bureau of the Federal Communications Commission, and representatives from CBS, DATRAN, AT&T, Fairchild Industries and Hughes Aircraft Company.



Dr. Charyk addresses the luncheon delegates.



Michael Onufry explains echo read-out.



Paul Visher (left), Hughes Aircraft Company, discusses domestic satellite proposals with COMSAT's John L. Martin, Jr.



Henri Suyderhoud describes satellite echo canceller.



Mr. Pritchard receives his award from Frederick L. Bagby, Vice President Section Affairs, AIAA.

Pritchard receives award from AIAA

Wilbur L. Pritchard, Assistant Vice President and Director, COMSAT Laboratories, has received the 1972 Aerospace Communications Award of the American Institute of Aeronautics and Astronautics (AIAA).

The award is presented annually to a person who has made an outstanding contribution to aerospace communications. Mr. Pritchard was cited for his communications satellite work while with Aerospace Corporation and COMSAT. This work included technical management and leadership of the team that conceived and implemented the military communications satellite program which led to the

initial defense communications satellite program and the NATO communications satellites, the conception and development of the unique X-band communications systems used in those satellites, and the organization and direction of the COMSAT Laboratories.

The award was presented to Mr. Pritchard at a luncheon during the AIAA 4th Communications Satellite Systems Conference in Washington, D. C., on April 25.

It is the second straight year in which a COMSAT officer received the award. The 1971 award was presented posthumously to Siegfried H. Reiger, COMSAT's Vice President, Technical, from May 1964 until his death in July 1970.

Eliassen elected ICSC chairman

Mr. Ernst Eliassen of Canada has been elected Chairman of the Interim Communications Satellite Committee (ICSC), governing body of the International Telecommunications Satellite Consortium (INTELSAT). His term of office will begin in July. He succeeds Mr. Carlos Killian of Argentina.

Mr. Eliassen is Vice President, Engineering and Operations, for Canadian Overseas Telecommunication Corporation in Montreal. He has been a member of the Canadian delegation to the ICSC since 1965, and has been serving as Vice Chairman of the ICSC since July 1971.



Mr. Eliassen

NASA's Allenby speaks at Labs

The COMSAT Labs hosted the April meeting of the Society for Applied Spectroscopy's Baltimore-Washington section.

Dr. Richard J. Allenby, Assistant Director for Lunar Sciences at NASA, spoke on "Recent Advances in Exploring the Moon."

His timely comments coincided with the flight of Apollo 16 and gave his audience a rare insight into some of the experiments carried out by Astronauts Young and Duke as they explored the lunar highlands.



Experiments with a 'center clipper'

BY HANS DODEL

Recently I was given a change in my office duties in the spectrum utilization department at the Plaza. I was to design, construct, and test an echo suppressor in the baseband processing branch at COMSAT Laboratories.

The purpose of my project was to test "center clipping" as a way of removing audible echo from telephone circuits. Echo, of course, is a potential problem in all long-distance telephone circuits and is of real concern to us in the communications satellite business.

The center clipper is an electronic (not mechanical) gate or switch in-

■ *Mr. Dodel is a member of the spectrum utilization department of the Headquarters Technical Staff.*

serted in a telephone circuit which allows all signals (voice waves) to pass through which are above a certain threshold level. Below that level, the switch opens and no signal at all passes. When the incoming signal rises above the threshold, the switch again closes and the signal continues through to the telephone at the receiving end. This sensitive, lightning-fast open-close operation depends on a threshold detector, which is set for a given input energy level, or voltage swing.

The effect of a center clipper on a telephone voice wave is illustrated in Figure 1. Only amplitudes exceeding the threshold band are passed through the electronic gate. Thus the center or low-energy part of the signal is deleted, or clipped.

The selection of this method is based on the fact that most of the echo is contained in that middle low-power band.

If you've followed me this far, you might be ready to ask: suppose a wanted signal (voice) and an unwanted signal (echo) arrive at the same time? Doesn't the switch stay closed, and so don't you hear the echo too?

My experiments showed that you don't, so long as the voice is at least eight times as strong as the echo—which it mostly is, even in the leakiest circuits.

When someone is actively talking to you, you don't hear your echo because it is overpowered by his speech. The instant the talking stops, you don't

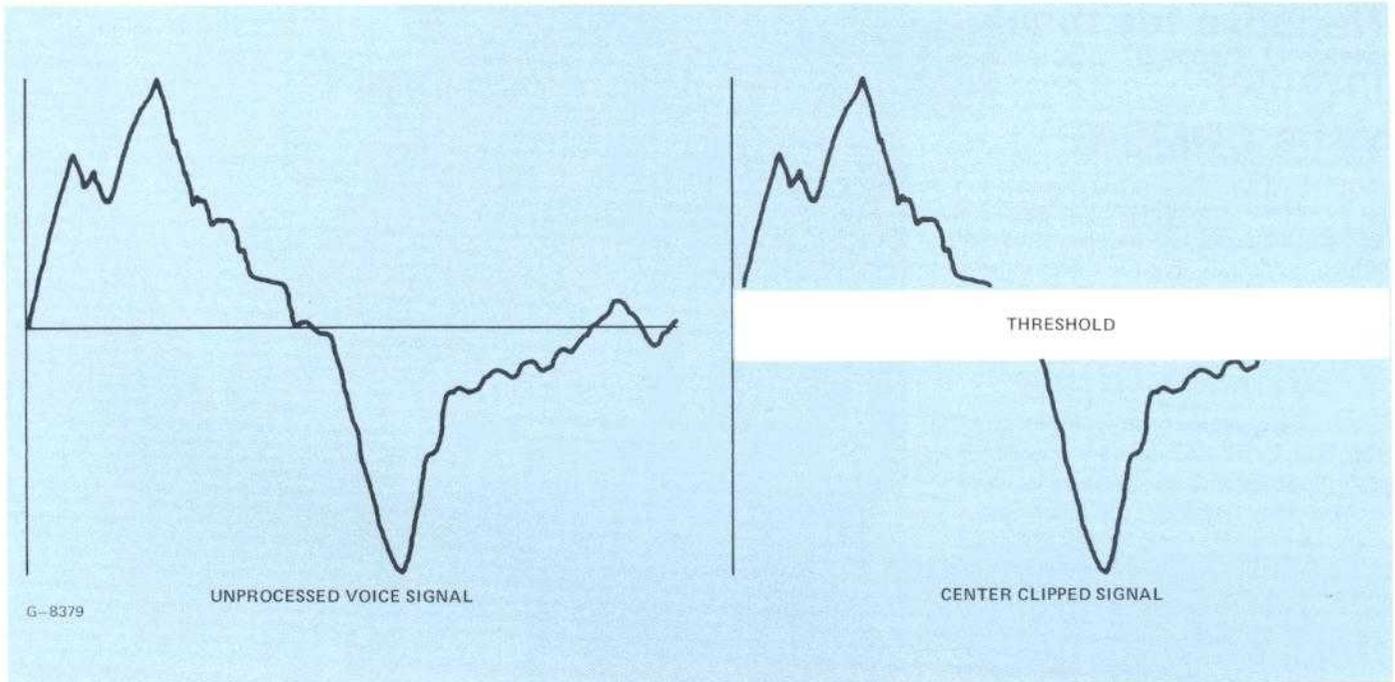


Figure 1. The effect of center clipping.

hear echo because the circuit is opened by the "clipper."

There are other ways of controlling echo, of course. One, the suppressor, has been used in telephone circuits for a long time. Another alternative, the canceller, is under active developmental testing right now at COMSAT Labs. The clipper, though, offers some unique advantages:

- All-electronic, noiseless operation; during—or in the transition to—double talk, there is no mechanical or electrical switching process as in conventional echo suppressors.
- Low cost.
- No maintenance.
- Low sensitivity to system parameters such as time delay and return loss, and circuit anomalies like overloads and phase rolls.
- Small size.
- Simple implementation.

At the Labs we simulated a satellite telephone circuit (with plenty of echo) and invited a number of people with no special telephone experience to rate the performance of various echo control devices, including the center clipper. Each pair of subjects talked for about 10 minutes. During each conversation we notified the subjects as we switched in three different echo control systems; they were then asked to rate each part of their conversation on a scale of "one" for the

best to "three" for the worst. These tests showed that, from the viewpoint of the typical telephone user, the center clipper serves at least as well as existing echo control devices.

I would like to thank Sidney Metz-

ger and Hans J. Weiss of the Plaza and Dr. Joseph Campanella and Henri Suyderhoud of the baseband processing branch at the Labs for their cooperation and encouragement in this project.



Hans Dodel tests his center clipping technique over a satellite circuit.

Negative feedback inventor visits COMSAT

Dr. Harold S. Black, the inventor of the negative feedback amplifier which made possible the development of broadband transcontinental and transoceanic communications systems, recently toured COMSAT as a guest of Chief Engineer Sidney Metzger.

Dr. Black, a long-time employee of the Bell Labs and now an independent communication consultant, conceived the negative feedback principle late in 1927 and finally obtained his patent in December 1937.

The final mathematical solution occurred to him as he was crossing the Hudson River on the Lackawanna ferryboat, en route from home to the Laboratories, on a bright sunny morning. On one page of his newspaper which by sheer coincidence was blank and fully dated, he wrote the equations that led to the solution. He signed the paper immediately and upon arriving at work 20 minutes later had a colleague also sign that he witnessed and understood what had been invented.

The late Dr. Mervin J. Kelly, President of Bell Telephone Laboratories, said in 1958:

"Black's invention of the negative feedback amplifier easily ranks coordinate with De Forest's invention on the audion as one of the two inventions of broadest scope and significance in electronics and communications of the past 50 years.

"The vacuum tube invented by De Forest and the negative feedback principle discovered by Black have made it possible to overcome the barrier of distance and to interconnect telephones throughout the world. Without the stable distortionless amplification achieved through Black's invention, modern multichannel transcontinental and transoceanic communication systems would not be possible. The negative feedback amplifier is now applied almost universally to amplifiers used for any purpose.

"It is no exaggeration to say that without Black's invention television networks which cover our entire country would not exist."



Don Ross, Operations Center (left), and Mrs. Black discuss the global system as Dr. Black talks with COMSAT Chief Engineer Sidney Metzger (far right).

Recent COMSAT Speakers

According to information available to Stephen D. Smoke, COMSAT speech coordinator for the Information Office, the following COMSAT officials have recently given public speeches:

George P. Sampson, Governor's Conference on the Future of Telecommunications for Hawaii, Honolulu, Hawaii, April 19.

John L. Martin, Jr. Governor's Conference on the Future of Telecommunications for Hawaii, Honolulu, Hawaii, April 19.

Sidney Metzger, Ninth Space Congress, Cocoa Beach, Fla., April 20.

Joseph V. Charyk, American Institute of Aeronautics and Astronautics, Washington, D. C., April 24.

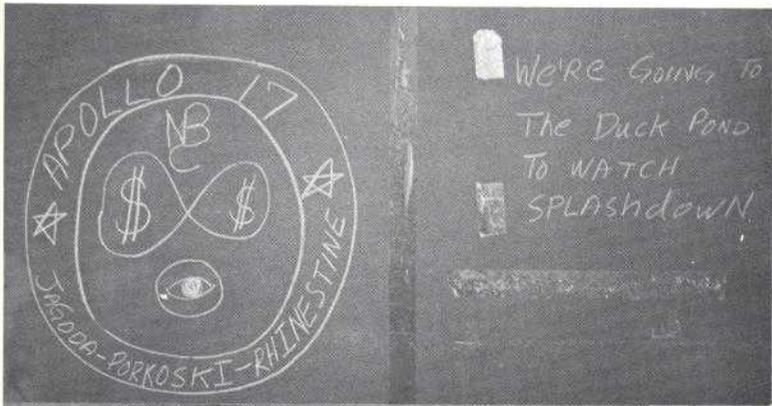
Joseph V. Charyk, COMSAT Industrial Symposium, Washington, D. C., April 27. Other participants in the April 27-28 program were: George P. Sampson, H. William Wood, Sidney Metzger, George A. Lawler, Louis B. Early, Dennis V. Neill, Lawrence W. Covert, Wilbur L. Pritchard, John G. Puente, and John L. Martin, Jr.

James J. McTernan, Jr., Financial Analysts, Philadelphia, Penna., April 28.

Matthew Gordon, Broadcast Industry Conference, San Francisco, Calif., April 29.

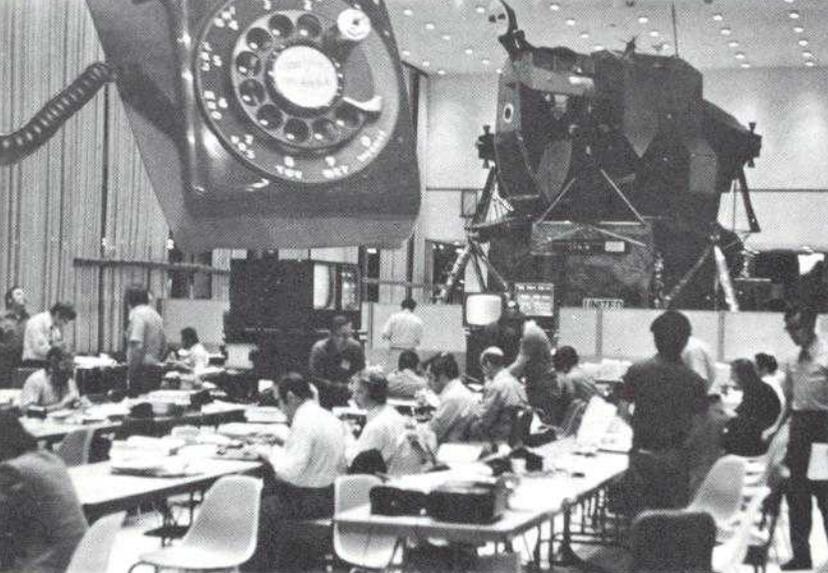
Joseph H. McConnell, COMSAT Annual Shareholders' Meeting, Washington, D. C., May 9.

Joseph V. Charyk, COMSAT Annual Shareholders Meeting, Washington, D. C., May 9.



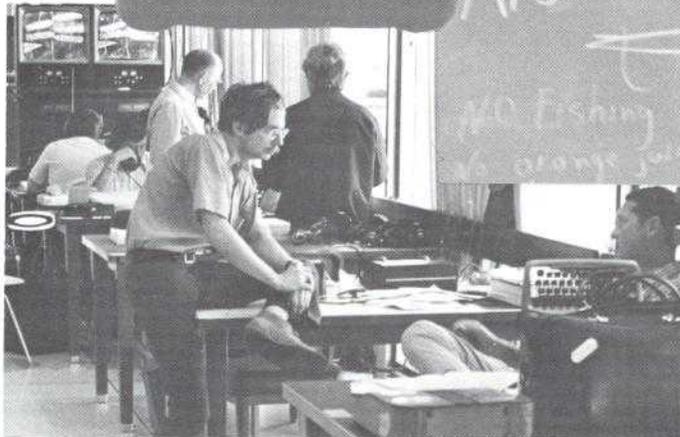
APOLLO MISSION

EVENT	DATE	GMT	HR	MIN	SEC	GMT	REMARKS
200	10/11	17:00	00	00	00	17:00	...
205	10/11	17:00	00	00	00	17:00	...
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E.B.U
Quiet, Please
E.B.U.
Posted!
No Hunting!
NO Fishing
No orange juice drinking



The Cape Kennedy story of the Apollo 16 launch

BY LARRY G. HASTINGS

The Apollo 16 launch was scheduled for 12:54 p.m. Sunday, April 16. "One Million Visitors to Witness Launch" headlined the local press.

Arriving at the Orlando-McCoy Airport on T-2 days (Friday) was like being plunged into a gigantic sauna bath populated with kids wearing Mickey Mouse ears, other kids looking forward to wearing Mickey Mouse ears, oldsters (many showing evidence of the Mouse's nearby Magic Kingdom),* bagged oranges, scores of hurrying newsmen and gallons of sweat. Planes to Orlando were full to capacity and, according to Eastern and National Airlines, all had standby waiting lists.

Jetty Park, a public campground on the Atlantic adjoining Cape Kennedy, had 10,000 persons camping there.

Hertz, Avis and the other car rental agencies brought in extra cars from all over Florida and from adjoining states to meet the surging demand for cars. By 5 p.m. on that Friday, the Hertz lot at Cocoa Beach, which adjoins Cape Kennedy, was empty—all cars rented.

The prevailing mood at Cocoa Beach on Friday was unusually carnival-like. NASA announced earlier in the day the selection of the Kennedy Space Center as the prime site for the space shuttle program. The shuttle program will involve the design, development, launch and landing of a 707-sized, reusable rocket ship which is to make trips between the launch sites and orbiting sky lab-

*Disney World is a 20-minute drive from Orlando Airport.

■ Mr. Hastings is a COMSAT senior information officer.



The Apollo 16 astronauts board the transfer van for the ride to the launch pad.

oratories in the late 1970s. The NASA announcement meant thousands of new jobs (estimates ranged from 7000 to 15,000 with the lesser number most likely). This meant a resurgence of the cash flow for merchants, Realtors and all of the other businessmen whose livelihoods depend on the spaceport workers. So the elation usually in evidence just before an Apollo launch was intensified and amplified noticeably as a result of the good news.

Nimrod campers, Airstream Trailers, Dodge mobile homes, station wagons and hippie-type VW busses were rolling into town much as pioneer wagons must have converged on the Sutter's Mill area following the discovery of gold in 1849. By Saturday night, Jetty Park, which is a public campground on the Atlantic adjoining Cape Kennedy, had 10,000 persons camping there. This was by actual head count, taken as camping fees were collected at the gate. Brevard County health authorities, apparently running short of Port-o-johns and Johnny-on-the-Spot portable restrooms, speculated uneasily how thousands of campers could be accommodated with only 25 of these little facilities.

While the sanitary facilities were in short supply, Apollo souvenirs were not. Unlike previous launches when seekers of ashtrays, patches, pins and

hats ravaged the little gifts shops and left only empty racks, the merchants were well prepared for this launch.

Still in business were the town's two pornographic "XXX-rated" movie houses. These little porn theaters are located in shopping centers and are a source of embarrassment to some shoppers. One has live nude models for photographic purposes" (camera and film may be rented) and has made a great contribution to good grooming by providing a topless shoe-shine girl.

At dusk, huge search lights illuminated the white vehicle. . . .

It is difficult to judge how much business these little smut shops do, for rarely is anyone seen going in or coming out and practically no cars park directly in front of them. But on balance, they are maybe off-set by the fact that a fundamentalist preacher and his reformation movement have taken over what used to be the Cape Kennedy Hilton, closed the bar and now hold evangelistic meetings and conferences at the hotel's convention center on an almost daily basis.

Saturday, Cocoa Beach was a day-long traffic jam on A-1-A, its main street. Many restaurants were crowded all day, with lines reaching

outside to the street at the dinner hour. Churches were holding special Apollo 16 prayer services in the evening and a check of their parking lots indicated very good attendance.

Among the VIPs were King Hussein of Jordan, Julie Eisenhower, Tricia Cox and Vice President Agnew.

Late in the afternoon, the gantry or service tower surrounding the Saturn V rocket which was to lift its precious human and mechanical payload from the earth, was rolled back to its safe position. At dusk, huge searchlights illuminated the white vehicle which, in the darkness, looked like a gigantic lighthouse with no revolving beacon. Already, both sides of the access road leading to the Air Force gate of Cape Kennedy were lined with rows of campers. These ranged from luxury-type mobile homes with their own power generators, television antennas and radio transmitters to the easyriders who slept in pup tents or sleeping bags by their bikes. Much in evidence was the American flag.

These campers would have an un-

obstructed view of the liftoff from the pad on Merritt Island across the Banana River. It was too early in the season to be bitten by a mosquito but the rattlesnakes in the area operate year-round, making on-the-ground sleeping hazardous.

Launch day was to be hot and bright. No clouds early in the day and the temperature in the 80s at launch time. For those who decided to sleep until 8:00 or 9:00 o'clock that morning, getting breakfast was an ordeal because of crowds. A 6:30 a.m. breakfast was fairly routine, but by 7:00 a.m. the dining rooms and restaurants were packed.

Driving from Cocoa Beach to the Cape was not a problem, although the thousands of campers and "bird watchers" along the causeway leading to the gate caused traffic to slow down considerably. When Apollo 7, the first manned Saturn mission, was launched in the fall of 1968, NASA invited 4000 guests to witness the launch from the space center. For Apollo 16, NASA issued 40,000 badges of different categories, each allowing its wearer admission to the Cape. Different colored badges meant admission to different areas. Of this number, 8000 ranked as VIPs and almost 2000

were news, radio, television and public information types.

COMSAT souvenir pins

For the Apollo 16 flight, COMSAT distributed lapel pins in the design of a small TV screen depicting live coverage from the moon's surface to a worldwide audience "via satellite." The pins were praised as one of the outstanding and original items distributed during the Apollo missions. Approximately 6000 were distributed at Cape Kennedy and at Houston, Texas.

Among the VIPs were King Hussein of Jordan, Julie Eisenhower and Tricia Cox (President Nixon's daughters) and their husbands, Vice President Agnew, former TV cowboy star (now space buff) Hugh O'Brian, Mrs. Robert H. Goddard and scores of dignitaries from the nation's scientific and political communities. The VIP site, simply row upon row of bleachers with comfort facilities and snack trucks, is located to the west of the huge vehicle assembly building—that 500-foot structure which can be seen for miles. To the east of the building is the press site. Both locations are about 2½ miles from the launch site.

The count ticks down, and then on time the Saturn V lifts off with a roar into an almost cloudless sky. . . .

The working press fares better at launches than does the VIP or average visitor. Members of the press are assigned a seat in a sheltered grandstand. Here they can have telephone lines, facsimile and direct broadcast lines installed so that stories and audio commentary can be moved at once. Of course, the real "biggies" are the TV networks—ABC, CBS and NBC. They have built permanent structures which are airconditioned studios with picture windows facing the launch site. Housed in these network "space centers" are Walter Cronkite, Jules Bergman, and John Chancellor along with experienced space men such as Frank Borman and Wally Schirra. The Voice of America, National Ed-



King Hussein of Jordan waves to well-wishers prior to launch.

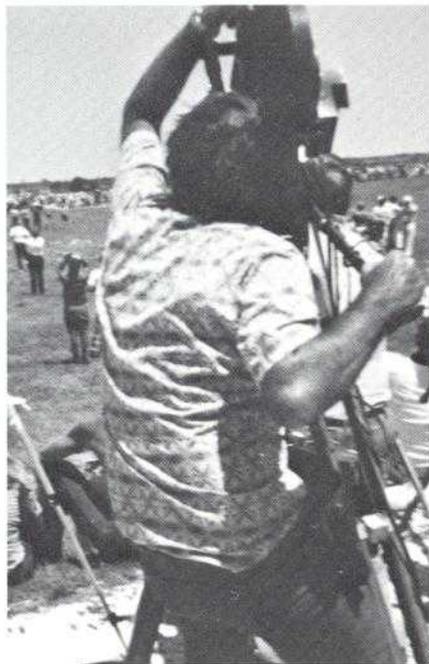


A soundman records the roaring noise of liftoff.

PHOTO BY M. GORDON

ucational Television (NET), Mutual Broadcasting and other organizations have trailers from which they operate.

The New York Times has its own trailer. Inside could be found long-time space writers Dick Witkin and John Noble Wilford and the Times' local representative Doug Dederer who publishes a local weekly newspaper, *The Surfside Slant/Islander of Cocoa Beach*. Television sets were



A cameraman films the liftoff.

PHOTO BY M. GORDON

tuned to each network and an Associated Press teletype clacked away in the background. A direct line teletype to the NYT offices in New York spewed out copy. A balky but well-stocked refrigerator nourished the Times staffers (as well as guests) with sandwiches and refreshments.

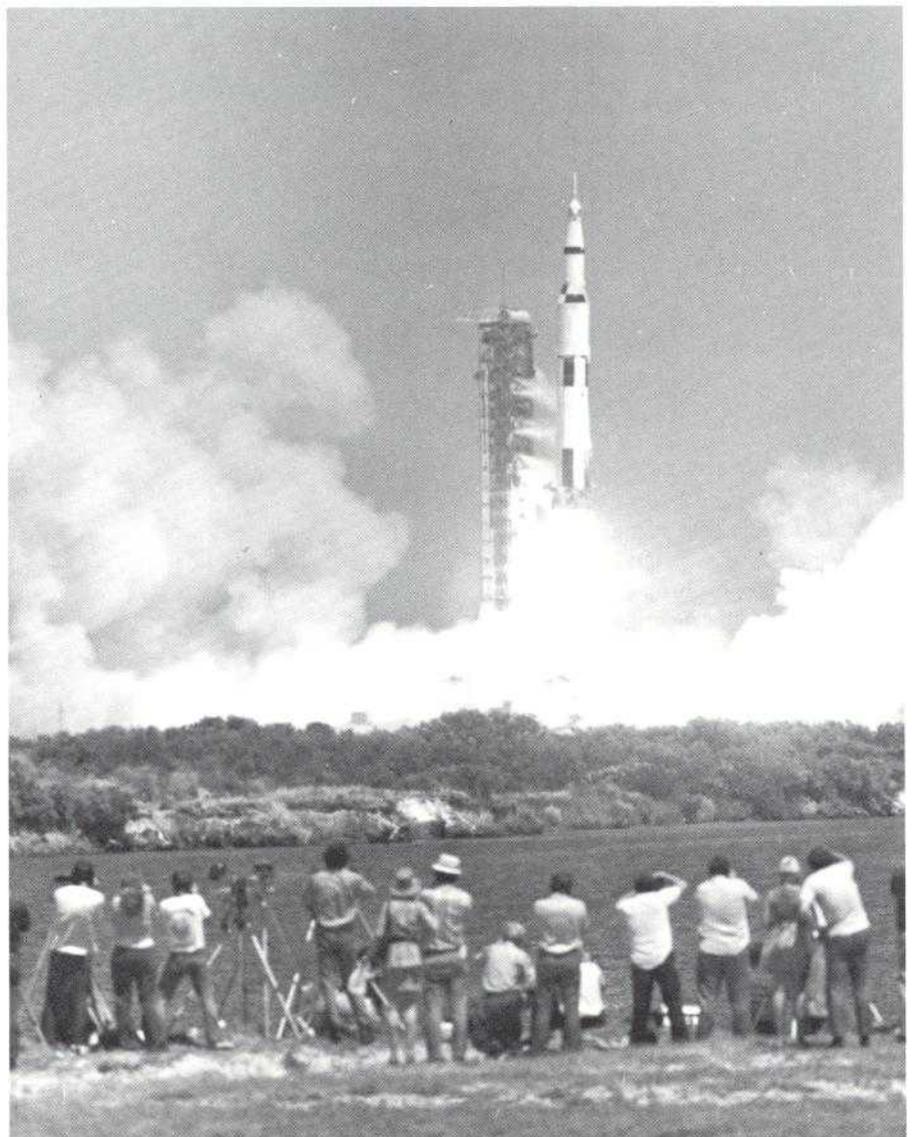
Special busses left the press site to go to the VIP site so reporters could see who was there, get interviews and generally get the feel of the crowd and its attitude. Other busses left for the Astronaut crew quarters to watch the trio board their special van to be transported to the launch pad.

As the morning grew toward noon, the sun seemed hotter and the food trailers got a work-out. Helping ease the load on the trailers, a snack truck (unaffectionately known as the "roach

coach") pulled up behind the grandstand with a fresh supply of cold drinks and sandwiches. Like a line of hungry ants trailing a sugar cube, the members of the news media followed the truck until it parked.

Then the reports began to come in over the amplified countdown line—"92 miles high, 116 miles down range. Apollo 16, you are go for orbit."

So far, all was well with the launch although there was speculation about a balky back-up gyro in the command module. Nobody seemed to worry.



Apollo 16 lifts off for the moon as cameras record the start of the 12-day mission.

NASA had been able to overcome such problems in the past.

The count ticked down, and then on time the Saturn V lifted off into an almost cloudless sky with a roar, a snarl and sonic cracks. The sky was so clear that first stage burn-out, staging and ignition of the second stage could be seen with the naked eye, which is most unusual.

Then the reports began to come in over the amplified countdown line—"92 miles high, 116 miles down range. Apollo 16, you are go for orbit."

At T plus 11 minutes and 54 seconds, Apollo 16 was placed in earth orbit. When all went well, in a little over 2½ hours after lift-off, the Saturn ignited its second-stage engines again and the trio of Young, Duke and Mattingly were on their way.

Posts that were not lonely on April 16 after the launch were those manned by Florida State Police and Brevard County Police. Following the Sunday launch of Alan Shepard and crew in Apollo 14 in January 1971, it took six hours to move by car from the Kennedy Space Center to Cocoa Beach. This time it was much better—one hour and 20 minutes from the space center to Cocoa Beach.

On the Banana and Indian Rivers, hundreds of boats, large and small, headed back towards their moorings after watching the launch from their excellent vantage points.

One day later, it was all but impossible to tell that a major event of worldwide interest had taken place 24 hours earlier. Traffic was perhaps a little heavier than usual and the dining spots a little more crowded but the big show with its supporting cast had already moved to Houston. Standing on Complex 39 was the launch stand and its service tower with charred paint and scorched fittings, looking like a lonesome sentry watching over the spot from where men had once again left earth, headed for the moon.

But, it will all happen one more time. Apollo 17 is planned for the night of December 6, 1972. That one will be the finale, the last manned lunar launch in the present U.S. space program. After that, for a while at least, the moon will go back to rhyming with June, spoon, croon, and serving as a beacon for lovers.

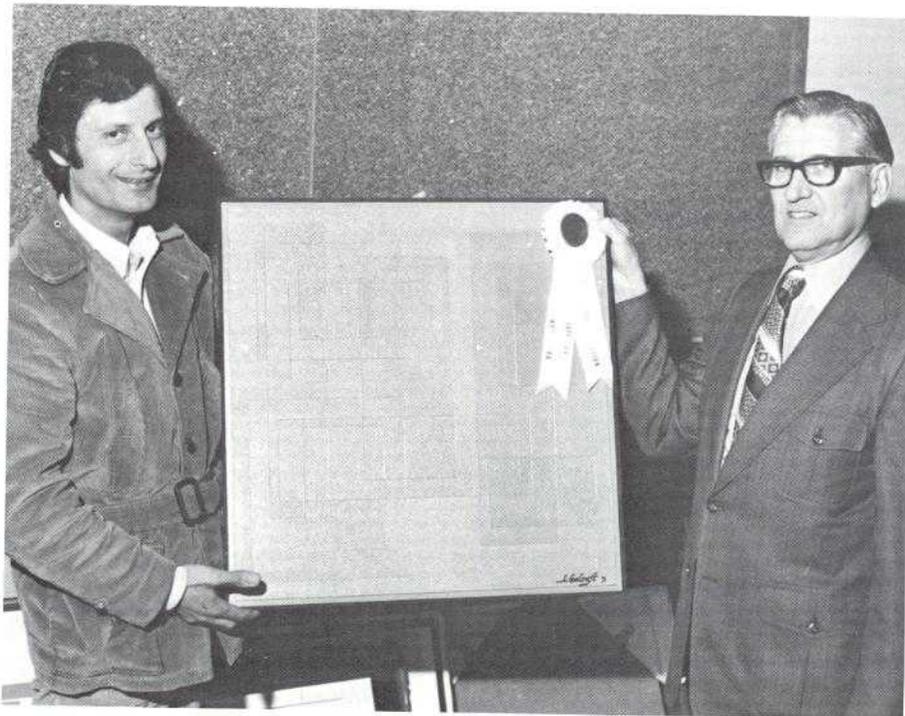


Mr. Hollinshead

NASA names new information chief at Cape Kennedy

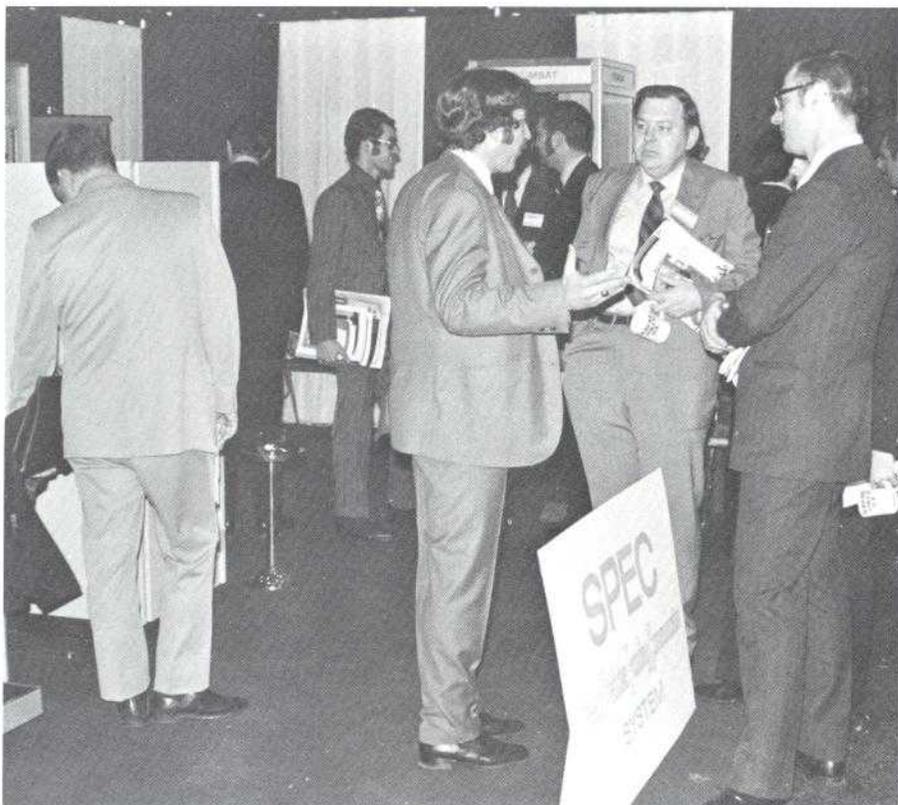
Charles T. "Chuck" Hollinshead, 40, has been named chief of public information for NASA's Kennedy Space Center, succeeding Jack King who has been transferred to the Manned Spacecraft Center in Houston. Hollinshead had previously been with NASA at the Cape, leaving in 1970 to take a position in private industry.

Hollinshead, a former Navy pilot, has the hobby of scuba diving and enjoys his work as an information officer. He and his wife, Joanne, have two sons. He was the "Voice of Apollo" on the recent Apollo 16 launch and will become familiar to COMSAT personnel as he provides count-down commentary on INTEL-SAT launches.



COMSAT purchases work of art

John C. Hill, II, COMSAT Director of Planning Services (right), accepts a prize-winning painting by Robert Schoolcroft, a Tarrytown, N. Y., artist. Purchased by COMSAT during the First Annual Cherry Blossom Art Festival held at L'Enfant Plaza, Mr. Schoolcroft's painting won honorable mention among more than 200 entries. A portion of the proceeds of the Festival went to benefit the Southeast Neighborhood House, an educational, recreational and day care center located in the Anacostia section of the District of Columbia.



More than 3000 persons visited COMSAT's display and demonstration.

SPEC demonstrated at IEEE meeting

The Speech Predictive Encoding Communication System, designed by COMSAT Labs engineers, was displayed and demonstrated at the recent IEEE International Meeting held in New York City.

SPEC is a technique capable of doubling the voice circuit capacity of an INTELSAT IV transponder, while providing quality satisfying both national and international PCM transmission requirements.

COMSAT's display consisted of a demonstration that permitted visitors to test the quality of the system. A two-way conversation through SPEC over a typical telephone circuit was established in the display area. A channel loading unit, consisting of 60 cassette tape players, was used to provide a selectable number of pre-recorded conversational speech inputs to the system. This technique allowed flexibility in controlling both the number of off-hook trunks as well as average speech activity, enabling a subjective evaluation of system performance under a wide variety of operating conditions.

Many of the visitors showed a keen interest in the working of the system and its adaptability to their own communications needs.

Net income up, dividend increased

COMSAT's Board of Directors declared the Corporation's seventh quarterly dividend on April 21 and increased the amount to 14 cents per share from 12½ cents per share. It is payable on June 12, 1972, to all shareholders of record as of the close of business on May 12, 1972.

The dividend was increased "in recognition of COMSAT's current level of annual earnings." For 1971 the Corporation reported net income of \$22,537,000 or \$2.25 per share, as compared to \$17,501,000 or \$1.75 per share for 1970.

The increased dividend is at the maximum allowable rate under the current guidelines established by President Nixon's Committee on Interest and Dividends. They provide that in 1972 there may be paid an annual dividend of up to 25 percent of the previous year's net income.

COMSAT also reported that net in-

come for the first quarter of 1972 amounted to \$6,496,000 or 65 cents per share, compared to \$6,691,000 or 67 cents per share for the first quarter of 1971.

Net operating income increased to a record \$5,006,000 or 50 cents per share, compared to \$4,621,000 or 46 cents per share for the first quarter of 1971 despite an increase in depreciation and amortization of \$2,187,000. Other income, however, decreased to \$1,490,000 from \$2,070,000 for the first quarter of last year primarily because of lower earnings on the company's portfolio of temporary cash investments.

Revenues increased to \$25,240,000, compared to \$21,934,000 for the first quarter of 1971, as a result of increasing use of the satellite system. At March 31, 1972, COMSAT was leasing full time to its customers the equivalent of 2537 half circuits, an increase of 91 percent over the 2130 being leased as of March 31 last year. The addition of 93 new half circuits during the quarter was offset by the loss of an equal number of existing circuits primarily due to a phone strike in Puerto Rico with the result that there was no net change in the number of leased half circuits for the quarter.

Temporary service, again consisting primarily of the restoration of service for submarine cable outages, accounted for approximately \$1,364,000 of the revenues, compared with \$1,381,000 for the first quarter of 1971.

Operating expenses (including income taxes of \$5,319,000) amounted to \$20,234,000, compared to \$17,313,000 for the first quarter of last year.

Earth station count

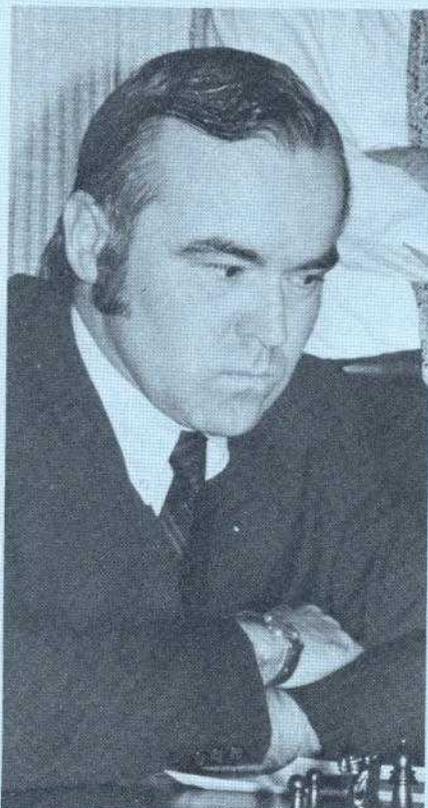
Five new antennas have become operational during 1972. They are at Andover, Maine (No. 2); Balcarce, Argentina (No. 2); Gandoul, Senegal; Philibert Tsiranana, Malagasy Republic and Trois Illets, Martinique.

The count of operational facilities as of mid-May was:

- 67 antennas
- 55 earth station sites
- 41 countries operating stations.



Champ Tom Throop in a tight spot.



Bob Swensen ponders a combination.

COMSAT EMPLOYEE NEWS



John Maddox stalks Throop's queen.



Irwin Rowe a pawn ahead.

Throop wins chess tourney

Tom Throop of the Labs has won the first combined Labs-Plaza chess tournament. He defeated John Maddox, the Plaza champion, in three out of four games.

In the Novice category, Irwin Rowe of the Labs topped Bob Swensen, Plaza, with two wins and a draw.

The four finalists were the winners in Experienced and Novice divisions in the round-robin play at Headquarters and at Clarksburg. Twenty-eight players competed in individual matches beginning last October.

Wilbur L. Pritchard, Assistant Vice President and Director of COMSAT Laboratories, presented the trophies to the new champions.

PHOTOS BY J. T. MCKENNA



Members of the Paumalu Investors Associates are (left to right) Glenn Vinquist, Ken Yamashita, Bob Kumasaka, Norm Murakami, Rick Senones, Tom Ota and Bob Makizuru.

Paumalu staffers learn and earn in stock club

BY ROBERT N. KUMASAKA

Succumbing to the TV advertising of the largest brokerage house in the country, several Paumalu employees decided to ride the "bulls" and organized an investment club at the station. The Paumalu Investors Associates was established two years ago after the following notice appeared on the station bulletin board:

"Anyone interested in becoming a member of a dynamic, growth oriented partnership whose purpose will be to invest its assets solely in stocks, bonds, and securities for the education and financial benefit of the partners, should contact the undersigned."

Fifteen employees responded by applying for membership in the fledgling partnership. On March 1, 1970, with capital assets of \$900, the investment club started with two goals—to assist members in learning more about investing, and to accumulate a sub-

■ Mr. Kumasaka is administrator of the Paumalu Earth Station.

stantial security account from small monthly payments.

The club's bylaws provide for at least one meeting per month. These are held after normal working hours in the station conference room. At these meetings members present reports on securities they have studied, discuss the club's portfolio, and decide on purchasing new securities or selling those already held.

These meetings also give the members an opportunity to discuss broader economic and political events and their possible effect on business and the stock market. Most important of all, the meetings provide an opportunity for station employees—technicians, maintenance men, clerical and supervisory personnel—to socialize and have some fun too.

Today, after two years of operation, the membership has been reduced to 11 because of personnel transfers and resignations. However, the club's assets exceed \$8000 with a portfolio principally made up of seven "growth oriented" stocks. Following the philosophy of the National Association of Investment Clubs, the group buys and sells regularly, reinvests all its earnings, and concentrates on growth type companies.

Presiding Partner Ken Yamashita has headed the Paumalu Investors

Associates since its inception. He is assisted by Financial Partner Bob Kumasaka and Secretary Robert Makizuru. Other members include Howard Bunch, Dan Geer, Bob Manske, Ron Miyasato, Norm Murakami, Tom Ota, Dick Senones and Glenn Vinquist.

Andover technician receives diploma

Harold Frazier, a senior technician at Andover, was recently awarded a diploma for successfully completing a program of study in electronics offered by CREI, a continuing education unit of McGraw-Hill, Inc.

A COMSAT employee since February 1967, Mr. Frazier specialized in the field of missile and spacecraft guidance and passed his final examination under the supervision of a special proctor at Andover.

From COMSAT west

BY AL VERBIN

Our current activities are concentrated on preparations for the fourth INTELSAT IV launch, now scheduled for mid-summer.

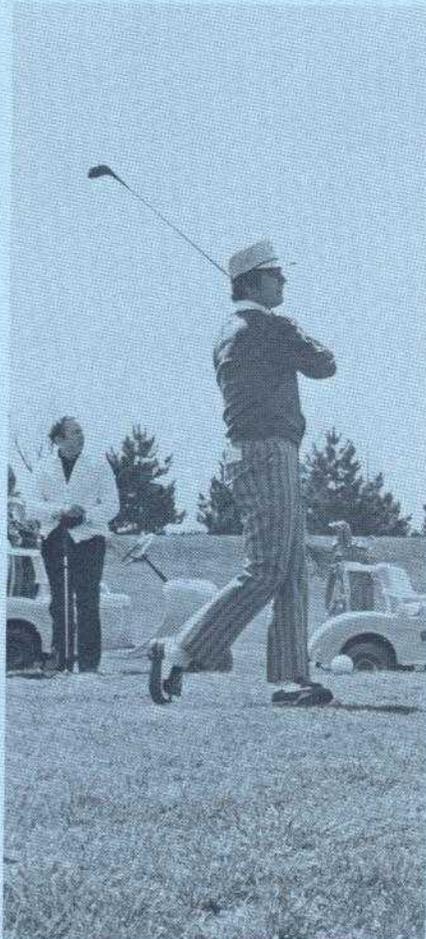
The COMSAT West Employees Association recently held its election for CEA officers. A run-off vote was required to determine the winner. The newly elected officers were Jeff Robinson, president; Mary Vonnegut, vice-president; Phil Avruch, first vice-president; and Suzanne Powell, secretary-treasurer.

Additionally, others were assigned to chair various "committees of one" for activities, cultural and otherwise.

The first in the category of "otherwise" was a "Go Tell Your Boss to Fly A Kite" day planned by Irv Dostis. CEA provided arrangements and refreshments. The event was a great success and, believe it or not, a kite was even flown.

A set of bylaws was prepared by Phil Avruch. Needless to say they are monumental and we hope they will do the job.

■ Mr. Verbin is a member of COMSAT's West Coast technical project office.



Dave Burks, Operations, tees off.



Don Greer, Executive, watches his drive.

Burks shoots low gross, wins CEA spring golf

Dave Burks, INTELSAT system management, continued his winning ways as he carded a low gross score of 81 over the Washingtonian Country Club course to win the CEA's Second Annual Spring Tournament. His round, played under sunny skies, included an eagle on the par four, 393-yard, sixteenth hole. He sank a wedge shot on the temporary green from 100 yards out.

Low net was won by Drew Walker, COMSAT Labs, with an 83-9-74.

More than 70 players including several ladies joined in the play, which was postponed from the previous week because of torrential rain. Ruth O'Donnell, Executive, won ladies' low gross honors, while Toni Loomis, Legal, won low net.

Other first and second place winners were:

First Flight—Low Net: Don Greer, Executive; Jim Owens, COMSAT Labs.

Second Flight—Low Net: Leo Keane, Domestic and Aeronautical; Norm Schroeder, Technical.

Third Flight—Low Net: Gerry Embrey, Technical; Bob Redick, COMSAT Labs.

Fourth Flight—Low Net: Don Fietkiewicz, Operations; Tom Gabriszeski, Domestic and Aeronautical.

Longest drive on the 420-yard ninth hole: Bill Brauer, Technical.

Closest to the pin on the 195-yard fourth hole: Lyn Heiges, COMSAT Labs.

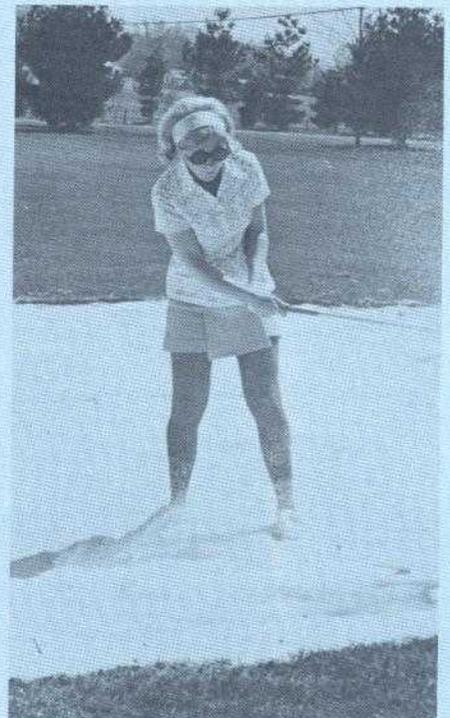
Raffle winners were Jim Dunlop, COMSAT Labs; Don Greer, Executive; Jim Johnson, Legal; and John Keyes, Domestic and Aeronautical.

A special birdie award (a dead fowl found on the course by Don Greer) was "won" by John Heck, Management Review and Coordination.

Arrangements for the outing were coordinated by Dave Burks and John Welch, both of Operations, and Paul Flemming, COMSAT Labs.



Jim Johnson, a COMSAT lawyer, heads for tee.



Shirley Oliver, Operations, blasts out of a trap.

PHOTOS BY WALLY MERCER



Operation's John Welch hits one from the fairway.



Ruth O'Donnell, Executive (left), and Legal's Tony Loomis wait to tee off.



Pat Lamphear, Technical, catches her breath.



Technical's Jim Rinehart and Bob Jordan look for that elusive white ball.



Gail Davis records election results as Carl Johnson assists.

PHOTOS BY ALLAN GALFUND

Credit union reports successful year

BY BETTY GARRISON

The fifth annual meeting of the COMSAT Federal Credit Union was held March 22 on the eighth floor of the COMSAT Building. About 95 members were present to hear the reports of the officers and to elect new members to the Board of Directors and the Credit Committee.

Jim Kilcoyne, the outgoing president, discussed the highlights of the Credit Union since its inception in November 1967. He stated that shares grew from \$451,900 at the end of 1968 to \$1,186,500 at the end of

■ Mrs. Garrison is a staff assistant in the office of the General Counsel and is the secretary of the COMSAT Federal Credit Union.

1971, while loans increased from \$197,300 at the end of 1968 to \$935,300 at the end of 1971. Credit Union membership reached a total of 1058 by the end of 1971.

Paul Rankin, treasurer, reported that dividends of \$53,900 paid to shareholders in 1971, were 51 percent higher than the \$35,700 paid in 1970. The gross income of \$91,300 in 1971 was 37 percent higher than the \$66,750 gross income in 1970. Mr. Rankin also stated that the delinquency rate of 2 percent for 1971 was well below the national average for federal credit unions of 3.2 percent.

Joe Wellington, vice president, and chairman of the credit committee, reported that 771 loans were approved in 1971, a 19 percent increase over the 646 loans approved in 1970. The total amount of the loans made in 1971 was \$1,134,000, a 46 percent increase over the \$777,000 loaned in 1970.



Secretary Betty Garrison records the meeting's activities.

Credit union board elects officers

Jim Kilcoyne, Information Office, was re-elected to his second one-year term as President of the COMSAT Federal Credit Union at a board meeting following the annual membership meeting on March 22.

Other officers elected by the board were Joe Wellington, Finance and Administration, vice president and credit committee chairman; Paul Rankin, Finance and Administration, treasurer; Betty Garrison, Legal, secretary, and Ted Gottry, Operations, assistant treasurer.

Earlier, the credit union membership elected two new directors, Louis B. Early, Corporate Relations, and Sam Scialabba, Finance and Administration, and re-elected Mr. Kilcoyne to a three-year term on the board.

The membership also elected three new members of the credit committee, Tyrone Ricks, General Services; Laura Weber, General Services, and David Wenzel, Finance and Administration. Walter Kutrip, Personnel, was re-elected. The other credit union member is Gene Christensen, General Services.

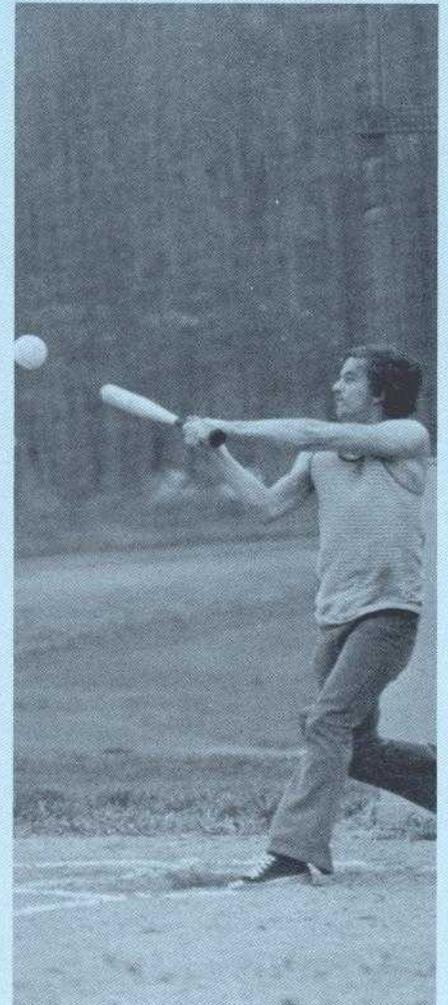
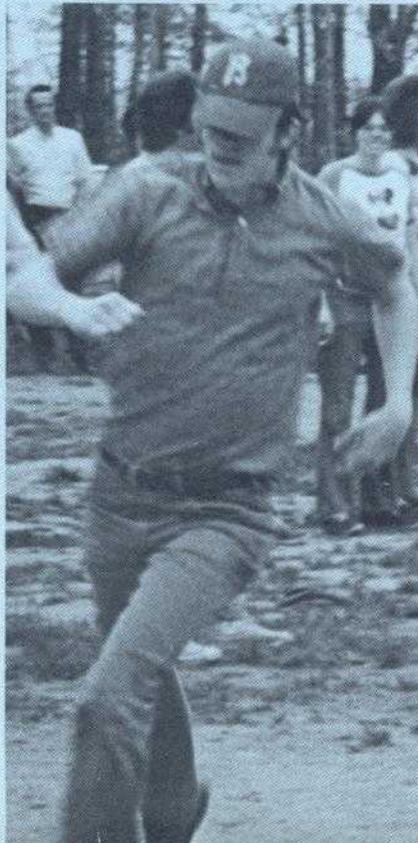
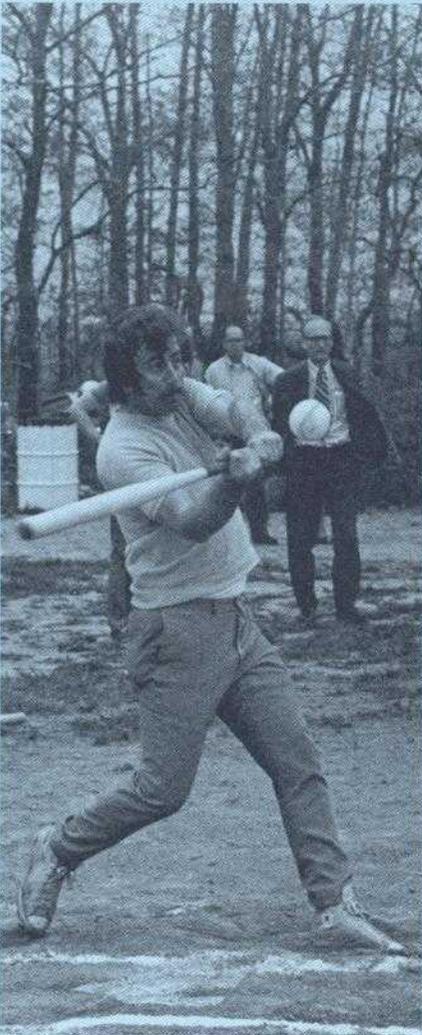


Play ball

PHOTOS BY DAVE REISER

The Lab's Slow-Pitch Softball League opened its second season on May 2 as Wilbur L. Pritchard, Assistant Vice President and Laboratories Director, threw out the first ball.

Six mixed teams in two divisions will be competing through the summer months with the championships scheduled for August.





Tyrone Ricks, CEA Ski Club vice-president, enjoys his own party.

CEA news and notes

BY SHIRLEY A. OLIVER

The COMSAT Visitors Center was the scene for the first CEA Ski Club cocktail party, held on March 24. With approximately 70 people attending the gala event, the turn-out was excellent. Audree Coutry was commended by all for her terrific bartending job.

The Plaza Girls softball team's opening game has been scheduled for the middle of May. Approximately 16 girls have already signed up to play. Come on out and join the fun! Practice starts at 1:00 p.m. each Sunday at Jefferson High School.

■ Miss Oliver is a secretary in Operations.

The Plaza scene

BY HARRIET BIDDLE

Spring blossomed in Washington with the sprouting of the crocuses, the daffodils, tulips, lilacs, and cherry blossoms, and later, the vibrant pinks of azaleas.

COMSAT employees throng around the fountains at the noon hour amidst the annual onslaught of spring tourists on those welcome warm, sunny days sprinkled among the occasional days of rain and drizzle.

On one of those rare but beautiful days in March, artists and craftsmen gathered to set up booths displaying their work around the Plaza fountain. Many of our employees browsed among the displays and some succumbed to such original handcrafted items as silver jewelry, tooled leather goods, stained glass decor, wood carvings, portraits and paintings. It was a unique show of quality art work and provided an enjoyable lunch-time activity for several days.

The COMSAT girls softball team went out for its first practice on Sunday, April 16, for an afternoon of fun followed by some painfully sore muscles the following day.

By popular request, throughout the month of April, our renowned traveler to China, George A. Lawler, COMSAT's Director of Marketing, presented his lecture and film series entitled "A Peek at Peking" to all interested parties. It has been observed that his accounts of the acupuncture scene are both sharp and poignantly to the point while his documentary on Red China is equally stimulating.

A lovely baby shower was given for Angie Brown, of Corporate Relations, in March. The table was set with a decorative and delicious lime-yellow cake baked by Linda Arnold, a tangy orange-pineapple punch was concocted by Jackie Wakeling, and an adorable cartoon stork, complete with pink umbrella, added just the right final touch. Angie now has a beautiful baby boy, John, born April 21.

■ Miss Biddle is a secretary in Management Review and Coordination.

Kathie Rissland, of International, returned to work with a sore throat after a tonsilectomy operation. It came as a surprise to Kathie as she had her tonsils removed as a child but evidently they decided to grow back.

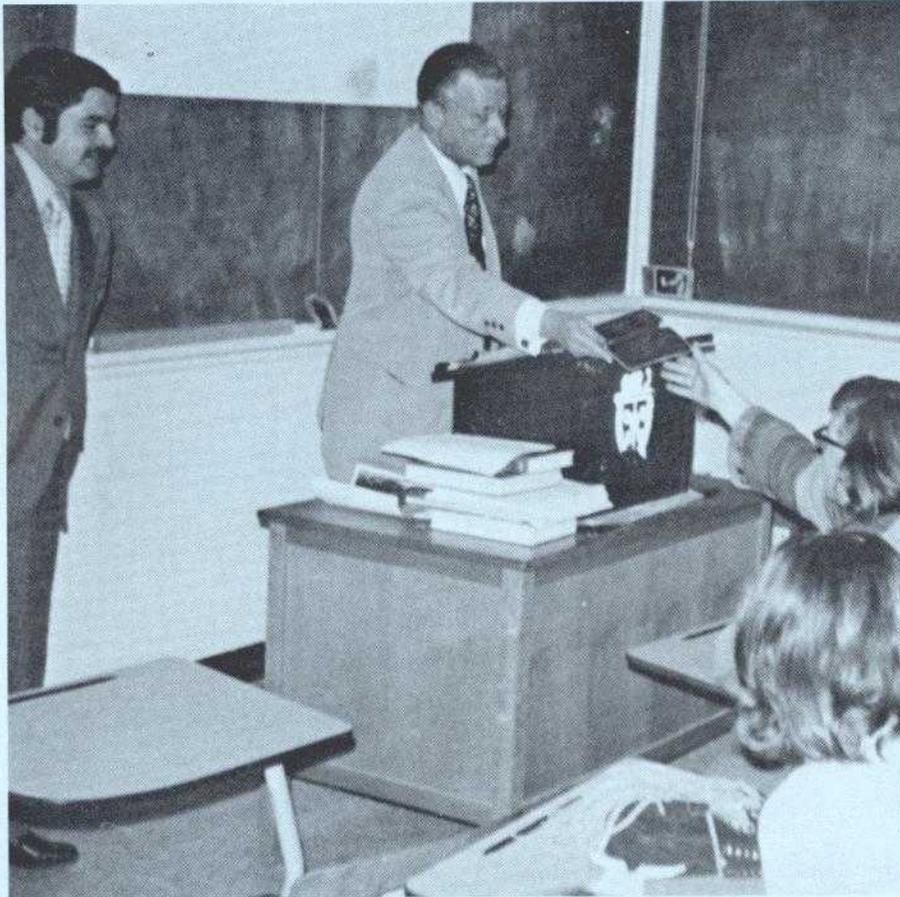
COMSAT has reason to be most proud of Mary Lane, of Technical, who is working toward her B.A. Degree in Liberal Arts at the University of Maryland. Thus far, she has made the Dean's list three times, has been elected to Alpha Sigma Lambda (a scholastic honor society) and was recently elected to both the Natural History Honorary Society and Phi Kappa Theta (a scholastic honor society for senior women). It is nice to have such an honored student with us.

While vacationing in Florida with friends, Joyce McKenzie, of Finance, and her husband visited the new Disney World for a memorable day wandering through the enchanted streets.

Paul Cooke, of Accounting, became the proud father of his sixth child on March 13. Phyllis Jefferson, also of Accounting, returned to work after giving birth to a son, Willie Chevez, on March 12—the exact day the doctor predicted! The Accounting staff gave her a small party to welcome her back.

Another member of Accounting, Nelson Slye, returned to work on April 25 with a gorgeous tan, after vacationing on St. Thomas in the Virgin Islands. He traveled there with his wife, mother-in-law (brave soul), and sister-in-law. Nelson is fond of the relaxed atmosphere of island life (he was in Hawaii this time last year), and particularly enjoys skin diving for coral.

As the weather turns warmer, all of us at the Plaza are making plans for those long-awaited summer vacations and it will be interesting to follow these activities in the Plaza Scene in the months ahead.



Joseph Finnegan (left) watches as George Lawler displays an acupuncture kit obtained during his recent trip to China.

Finnegan conducts lectures for local high school

Several COMSAT staff members recently discussed satellite communications with students of the Bishop Denis J. O'Connell High School of Arlington, Va.

As part of the school's progressive education program, Joseph Finnegan, Finance and Administration, organized and conducted a week-long series of lectures highlighting the development of satellite communications.

Described by Mr. Finnegan as a program whose purpose is to develop "fields of interest not normally incorporated in the daily academic curriculum," the week's activities included a tour of the COMSAT Operations Center and a talk by George Lawler, COMSAT Director of Marketing, on his recent trip to China.

COMSAT hosts area students

At the invitation of the Washington Chapter of the Administrative Management Society, COMSAT recently participated in the society's Junior Executive Day program by serving as host to four area high school students.

These young people, all outstanding business majors, spent the day learning of COMSAT and visiting with their "management sponsors" to study and observe particular management functions.

Twanna Barrett of St. Cecilia's Academy, Washington, D. C., spent several hours with her sponsor, Donald J. Chontos, Personnel. Brandt Bell of Northwestern High, Hyattsville, Md., assisted Louis B. Early of Corporate Relations, while Robert Kelly of Groveton High, Groveton, Va., and Terri Lee of Einstein High, Kensington, Md., worked with William H. Connor and Joseph D. Finnegan of Finance and Administration.

At Andover

By JOANNE WITAS

Richard 'Sven' Engblom, station administrator, recently attended a seminar on the Occupational Safety and Health Act (OSHA) regulations at Central Maine Vocational Technical Institute in Auburn, Maine. Sven is also attending a 30-hour Civil Defense training school in Auburn. When this first aid course is completed, he will have completed standard first aid, advanced first aid and Civil Defense self-help training. He is also trained in cardiographic and respiratory resuscitation and has received two Red Cross and two Civil Defense cards for all his efforts.

Congratulations to Belinda Briggs, the daughter of Mr. and Mrs. Al Briggs, facilities mechanic. She was installed as a new member of the National Honor Society in a traditional candlelight ceremony at Telstar Regional High School in Bethel, where she is a junior. Belinda was also selected as a delegate to attend Dirigo Girls State at Husson College, Bangor, Maine, in June.

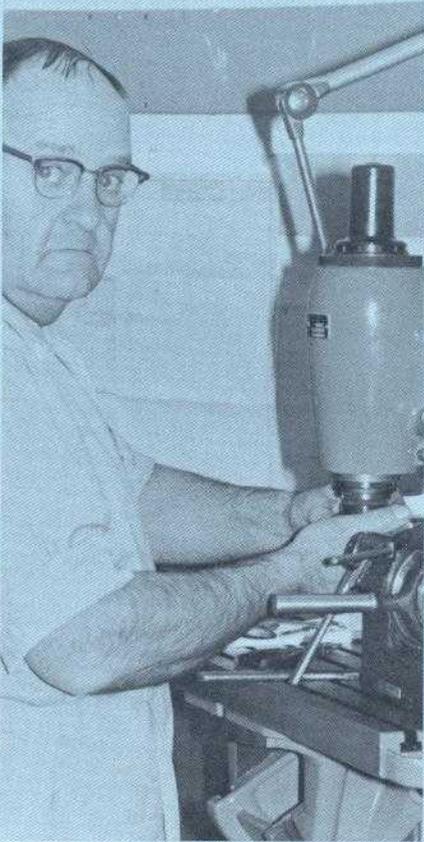
Dave Durand, chief engineer, recently gave a tour of Andover to Monsignor George Cyr, of Rumford, and a visitor, Father Gerard Van Der Heyden, a native of Holland and now a missionary in Malawi, Africa.

It seems that in the spring of the year, the topic of conversation around Andover is either "Miss Sharon" or the drag races. With the snow gone and spring weather in the air, drag racing and fishing are the sports of the season. Tackle boxes, fishing nets and poles have been brought up from the cellars and are being put into order for the open waters.

Shaun Arness, Dave Berry and Ray Juhl have already planned a number of fishing trips. For those of you who don't remember, by the way, Miss Sharon is a fishing lure.

As for the drag races, Jack Conner and Don Bachelder seem to be pretty much hepped up on this. Jack has been on vacation—getting his car in shape and Don's car is ready to go also.

■ Mrs. Witas is personnel-accounting clerk at the Andover Earth Station.



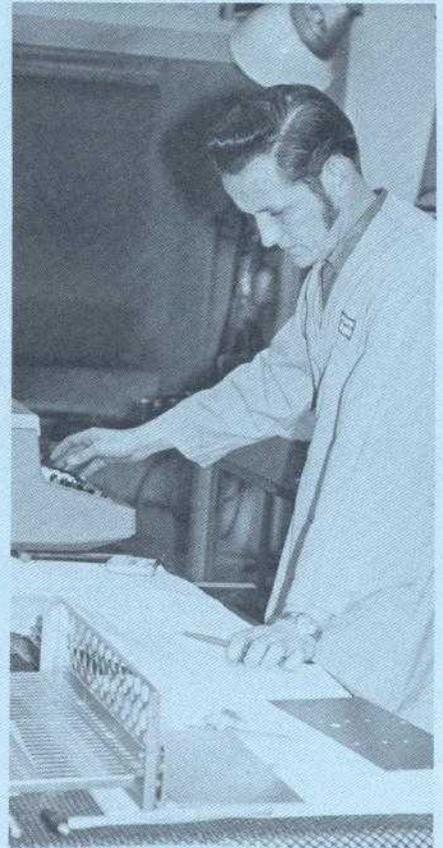
Ed Mobley changes a milling cutter.

Fast reaction and close tolerances

The COMSAT Labs Model Shop provides a variety of sheet metal components and assemblies. It is designed for fast, accurate support services.

In-house facilities include milling and turning capabilities, an assortment of grinders, furnace equipment and a welding room.

PHOTOS BY J. T. McKENNA



Bill Windell at the Strippit punch.



Al Eaton cleans a welded joint.



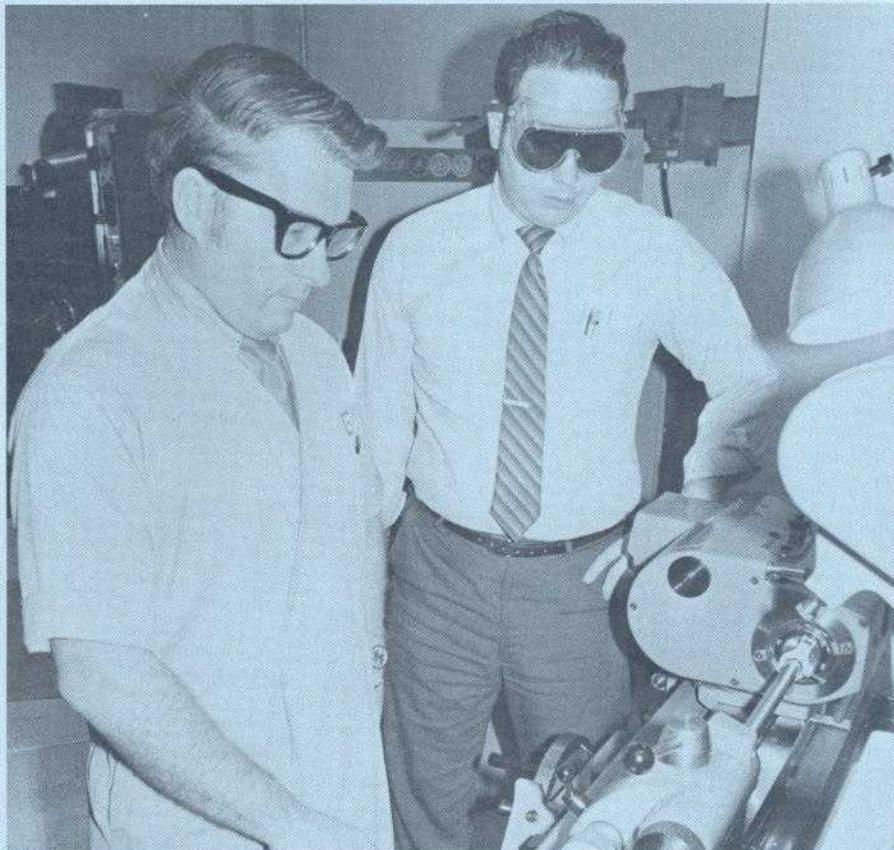
Manager Ron Kessler reviews incoming jobs with secretary Jan Sentell.



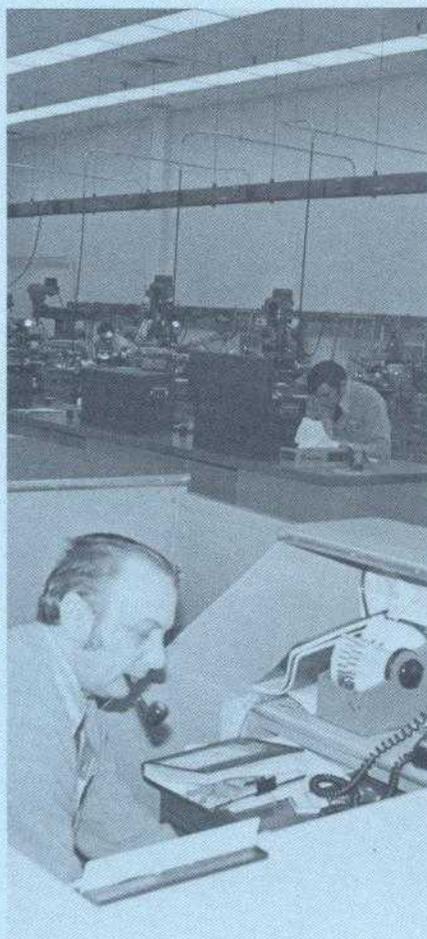
Roger Carlson files a sharp edge.



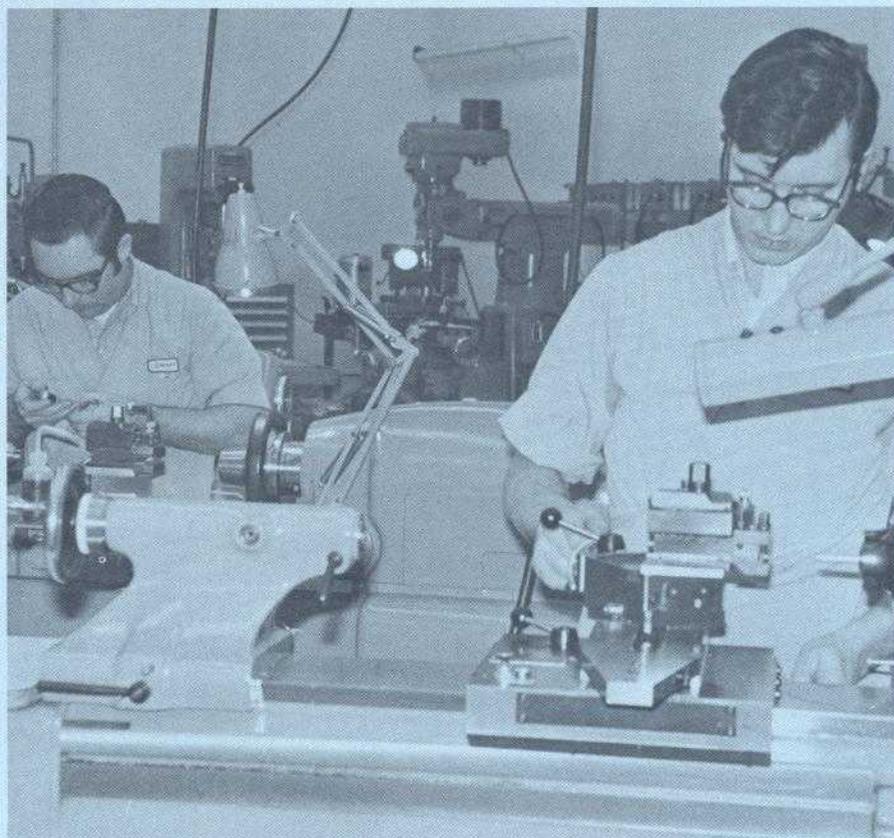
John Sickel uses heat treat furnace.



Don Fritz (left) sets up the external grinder as Ron Kessler watches.



C. T. Bowman prepares a work order.



Fred Smith (left) checks a part to verify tolerance as Ralph Ambrose turns a precision instrument shaft.

Brewster news briefs

BY ROBERT E. SANDERSON

Darrel Nelson, operations supervisor, was aboard the USS Ticonderoga as COMSAT's representative for the Apollo 16 splashdown.

Ramon Hashberger, operations supervisor, will be leaving Brewster this month to report to Headquarters prior to his transfer to NICATELSAT. His wife, Elisabeth, and son, Ray, will join him in Nicaragua later this year.

Wally Lauterbach, our station manager, has been in Juneau, Alaska, for the past several weeks, assisting in the coordination of the Alaska demonstration program.

Bob Sanderson has been promoted to chief engineer at Brewster. He and his family have moved into their new home in Malott and are still busy with the remodeling.

Jerry Hart, facilities mechanic, was transferred to the Bartlett Earth Station in April.

■ *Mr. Sanderson is chief engineer at the Brewster Earth Station.*

Etam review

BY DELORIS GOODWIN

Several personnel changes have occurred at Etam during the past three months. Jim Silvius, procedures and training supervisor, has been transferred to L'Enfant Plaza in Washington. He is working in methods and procedures in Operations and is concerned with updating documentation at the earth stations. Paul Helfgott has been assigned to replace Jim.

Bob Leard, formerly a senior technician, has been promoted to operations supervisor replacing Paul. Bob will guide the activities of our Blue Team.

Darrell Riddle, senior technician, recently accepted an assignment with the TT&C station in Fucino, Italy.

John Stanko, senior technician, has joined us from the Paumalu Earth Station. Welcome aboard, John!

■ *Mrs. Goodwin is accounting and personnel clerk at the Etam Earth Station.*



A J. A. production line in action.

COMSAT continues support of junior achievers

COMSAT has again joined other business firms in the Washington, D. C., area in contributing to the 1972 Junior Achievement program. Part of a national effort directed toward teaching business skills to high school students through ownership and operation of their own mini-corporations, the local effort was begun in 1965 with the creation of 13 student-operated companies. Since then 47 companies have come into being and plans for the coming year call for the operation of 71 companies in the metropolitan area.

Each Junior Achievement company is organized in the fall of the year as a miniature corporation with its own board of directors, work force and sales staff.

Made up of approximately 20 students, each corporation selects a product to make or service to provide. Stock is sold, production lines are established, advertising campaigns started and records are kept.

At the end of the school year the companies are liquidated and the profits or losses are absorbed by the stockholders. Thus in a single school year, these students have the opportunity to create, operate and manage a corporation of their own.

Liquidation time is fast approaching for the current program year. The 47 companies in operation this year are continuing to set new sales and production records. Ten companies have reached the \$1000 sales plateau as these young executives gain a realistic understanding of the organization and operation of a business enterprise.

5-year awards

The following personnel received five-year service awards during April and May.

Andover: Donald C. Bachelder, David D. Berry, Jack E. Conner, Richard B. Plantier and Bruce F. Simmons.

Brewster: Donald H. Briggs, Walter T. Cheeseman, Jim H. Erskine, Dewey F. Martin and Melvyn B. Tate.

Corporate Relations: Angela M. Brown.

Finance and Administration: Bonnie J. Arthur, Fred J. Hook, Benjamin P. Smith and Brenda E. Stott.

Laboratories: Denis J. Curtin, Leonard Golding, Ronald R. Kessler, Wilbur L. Pritchard, Robert W. Rostron, Michael Samuel and Joseph F. Stockel.

Operations: Walter F. Gugler and Sidney Browne.

Paumalu: Robert H. Makizuru, Franklin J. Meyer and Paul I. Motoyama.

Technical: John P. Falvey.



Safety training completed at Paumalu

Twenty-one Paumalu employees recently completed Red Cross safety training. In the left photo, instructor Dan Geer demonstrates the proper method of mouth-to-mouth resuscitation as Charlie Kraft (left) and Tom Kaneshiro watch. In the right photo, Dan explains the operation of the lungs.

People at the Labs

BY CAROL LOUTHAN

Now that spring has finally arrived, it seems that vacations are at the top of the agenda. Beautiful tans, peeling skin and sighs of "Oh, I didn't want to come back" are the order of the day. The beaches must be packed already!

"You'll never drive all the way again" is the motto for the new Autotrain, so Steve Clark, purchasing, and his wife, Sally, decided they would see for themselves. On a recent Friday night they and their car boarded the Autotrain for a week trip to Florida. They arrived in Sanford, Florida, Saturday morning at 11:30 a.m. refreshed and relaxed, ready for their drive to Ft. Lauderdale. Being in Florida wouldn't be complete without stopping at Disney World, where Steve and Sally took a trip to the moon and a ride to the bottom of the sea on a submarine.

Judy Calvo, personnel, with another great tan, just returned to work after a stay with her father in Miami.

■ Mrs. Louthan is a secretary at the COMSAT Laboratories.

Claudette Tucker, administration, and son, Jeff, recently spent two weeks in Florida with stops in South Carolina and Georgia. Naturally one big stop for Jeff was Cape Kennedy. After beautiful weather on their entire trip, they were greeted in Washington by (what else?) rain.

Betty Mowen, Labs nurse, and husband Bob loaded up their new Airstream trailer and spent a week camping at Myrtle Beach, South Carolina. With these nice weekends, I know there are sure to be a lot more trips for the Mowens in their Airstream.

On May 11, the Robinsons (Ernie works in the systems lab) were off on their second trip to Europe. Since they've already seen Germany, Austria and France, this time it's three weeks in Spain and Portugal.

Seems that Dave Lewis, systems lab, was trying something new on the basketball court and ended up with a torn knee cartilage. But, never fear, the crutches are gone and Dave will be ready for the softball field again this spring.

Bob Ridings, communications processing lab, is the proud father of a new baby boy. Daniel C. Ridings was born April 22 and weighed 9 lbs. 1 oz. Both mother and baby are doing fine.

Congratulations are in order for

Pep Wurtzel, office services, on her recent engagement to Rod Ruddiman of Upper Marlboro. Since Rod and Pep are both very active in the Silver Spring Stage, he very appropriately proposed on stage at the close of their latest production, "La Ronde." The engagement and the party which followed were complete with cake (which Rod decorated himself), decorations and "champagne for everyone."

After things had gotten somewhat back to normal around the Laboratories, another happy surprise was announced. Judith Coffey, librarian, became the bride of Sam Russell on Thursday, April 27, in a private ceremony in Rockville.

With the warm weather here, I am sure everyone is excited about the start of softball. Games started Tuesday, May 2. Blaine Shatzer's team was last year's winner, so we know everyone will be out there trying to top them this year.

The Labs will have a bowling league this fall thanks to the helpful organizing of Claudette Tucker and Dirk VanDerLoo. Beginning September, we'll all meet at Fairlanes, Shady Grove Rd., Gaithersburg, for an evening of bowling. Elected president of the group was Bob Cool. Betty Dorsey was elected secretary-treasurer.

COMSAT conducts satellite tests at Alaska sites

By DAVID W. LIPKE

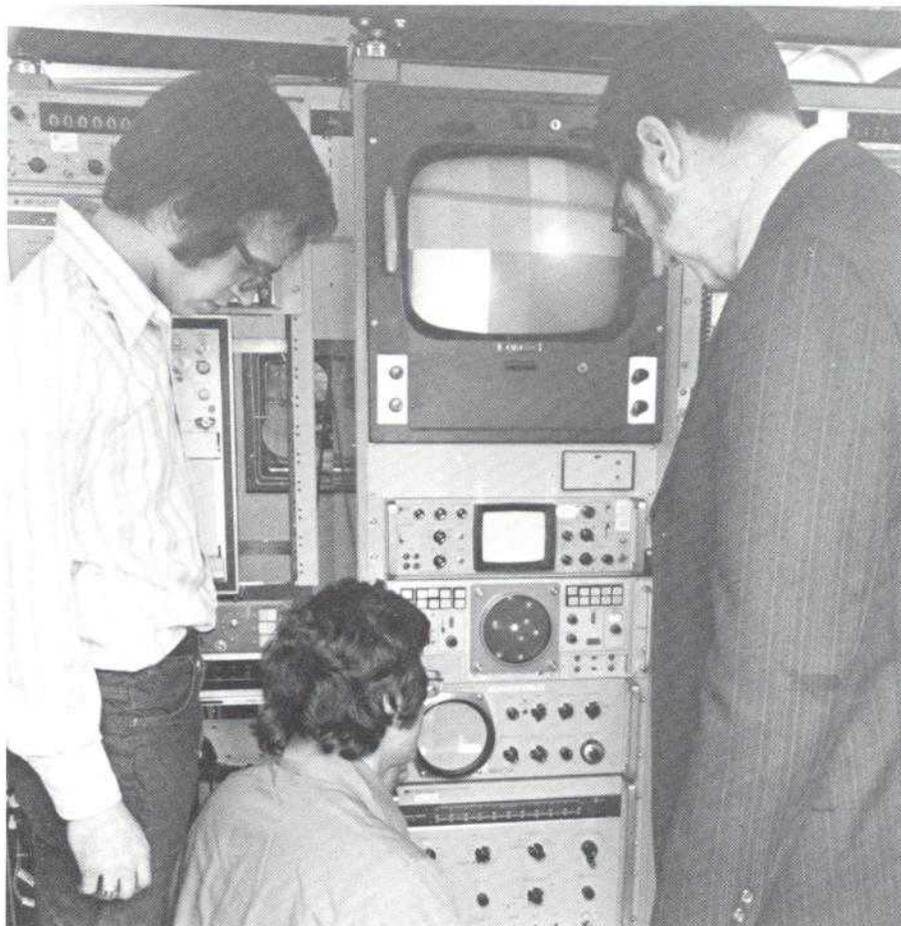
A small COMSAT earth station, previously located at L'Enfant Plaza, is being used for a series of satellite demonstrations and tests in Alaska. It will be in service at six temporary locations at Juneau, Kodiak, Bethel, Nome, Barrow and Fort Yukon.

The program is designed to demonstrate the advantages of satellite communications in meeting the communications requirements of small communities in remote areas, to determine the effects of extreme climatic conditions on satellite communications and to analyze possible interference from the aurora borealis.

Governor William A. Egan of Alaska and his office requested and helped arrange the test program, selected the six sites and cooperated with COMSAT in the planning of the services to be demonstrated.

The small earth station has been used at the Plaza for the past two years in a series of tests to determine the services that can be provided by such stations.

■ *Mr. Lipke is manager, special projects, on the Headquarters Technical Staff.*



Staff members Jim Castellan (left) and Jeff Steinhorn (center) discuss a color-bar test with manager Dave Lipke.

The station is equipped with a 16-foot diameter antenna which can be automatically "pointed" and has a fiberglass shelter which houses the electronics equipment.

It was dismantled on the evening of April 13, trucked to Seattle, and then shipped to Juneau, the site of the first demonstration.

These demonstrations will utilize for the first time a spot beam in the Pacific INTELSAT IV satellite.

A series of television programs produced by the Alaska Educational Broadcasting Commission, and voice communications, will be transmitted through the Bartlett Earth Station at Talkeetna, Alaska, to the satellite, then down to the small station, which will be installed at each of the six sites in rotation.

Data gathered during the program, which is expected to last several months, will help determine the feasibility of using small aperture earth stations for commercial satellite services to remote areas. In addition to

the demonstrations of TV and voice transmissions, engineers will collect test data with measurements on linear waveform distortion, baseband amplitude response, differential gain and phase and system signal-to-noise ratios.

At the conclusion of this program the station will remain at Fort Yukon where long-term propagation measurement tests will be conducted in conjunction with the University of Alaska.

Governor William A. Egan places the first telephone call from the COMSAT small earth station installed at Juneau for the first of a series of tests and demonstrations in Alaska. The demonstration program has received extensive news coverage throughout the state and elsewhere.

COMSAT

COMMUNICATIONS VIA SATELLITE



TV from the Soviet Union

Television of President Nixon's visit to the Soviet Union May 22-30 was widely viewed, especially in Europe and the United States.

Transmissions from the Soviet Union to the United States, however, were far more complex than transmissions from the People's Republic of China.

Transmissions from China entered the satellite system virtually at the point of origin through a transportable antenna, and pictures were taken by U.S. TV crews using standard U.S. 525-line, 60-frame NTSC (National Television Systems Committee) color equipment employed in the United States.

The transmissions from the Soviet Union were first sent via landline more than 2000 miles through Russia, Finland, Sweden and West Germany to the earth station at Raisting near Munich.

The complete landline routing from Moscow was to Tallinn, Helsinki, Stockholm, Goteborg, Malmo, Copenhagen, Hamburg, Hanover and Frankfurt to Raisting.

The Soviet Union uses the 625-line, 50-frame SECAM (Sequentiel Couleurs a Memoire) color signal. At Helsinki, this signal was processed and transcoded into the more generally used European 625-line, 50-frame PAL (Phase Alteration Line) color system for landline relay to Raisting.

At Raisting, the PAL color signal was again processed and converted into the U.S. standard 525-line, 60-frame NTSC signal, transmitted via Atlantic INTELSAT IV satellite to the COMSAT-operated earth station at Etam, West Virginia, and thence via landline to the TV networks in New York City for national distribution terrestrially.

The quality of the TV signal received at Etam via satellite was essentially the same as the signal transmitted from Raisting.



Your front row seat . . . via satellite

Important things are going on in the world.

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Comsat, a shareholder-owned communications company, operates the satellites in the global system...the U.S. earth stations for satellite communications...the COMSAT Laboratories and related technical activities that are creating new communications advances.

These operations are all part

of a worldwide satellite system...reaching into more than 60 countries...pioneering new potentials for domestic as well as international telephone, television, telegraph, data and facsimile communications.

In the United States, if it's via satellite, it's via Comsat.

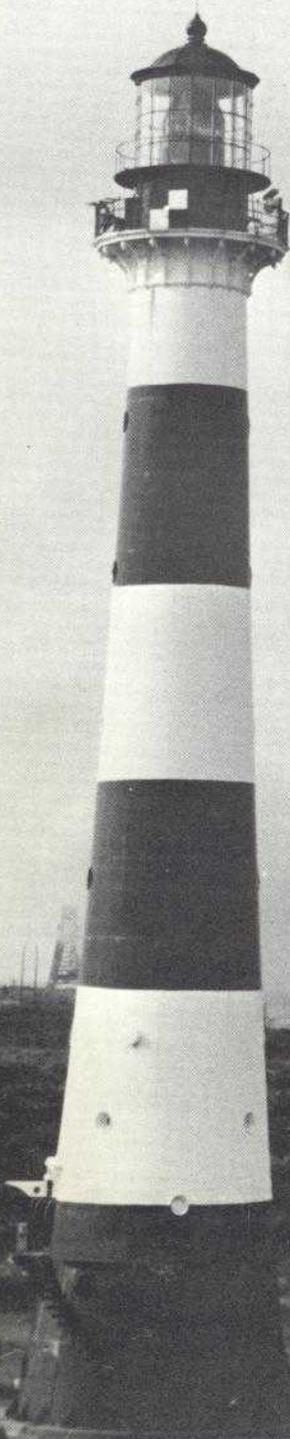
Write to Comsat's Information Office for the booklet, "Via Satellite, The Comsat Story."

COMSAT

Communications Satellite Corporation
950 L. Enfant Plaza, S.W., Washington, D.C. 20024

Shown above is a small version of the COMSAT advertisement which appeared in New York and Washington newspapers during President Nixon's visit to the Soviet Union.

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**COMSAT
NEWS**

July-August 1972

COMSAT NEWS

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On the Cover

The Cape Kennedy Lighthouse emphasizes the old versus the new characteristics of the Cape during the INTELSAT IV liftoff on June 13. For details about the successful launch and the lighthouse, see page 8. *Photo by NASA.*

July-August 1972—7th Year, No. 4

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**Matthew Gordon, Assistant Vice
President for Public Information**

James H. Kilcoyne, Jr., Editor



FCC Chairman Dean Burch

FCC postpones policy decision until September

BY HALE MONTGOMERY

The Federal Communications Commission put the hotly contested domestic satellite case in the summertime shade in July, postponing any further action until September, at the earliest.

The date its domestic satellite policy was to go into effect had been set for July 25. All applicants were to notify the Commission by then as to how they intended to proceed. But on July 19, a week in advance of that date, the Commission, on its own motion, extended the effective date indefinitely.

It said it did not appear practicable to give "due consideration" to all pleadings in the case before it in that time. An FCC Notice advised that the Commission would meet next on

■ *Mr. Montgomery is a COMSAT senior information officer.*

the issue in early September, but it then intended to consider a COMSAT petition for stay; the Notice was silent on when the Commission might consider substantive issues raised in reconsideration petitions and other filings pending in the case.

When it does return, the FCC faces strong petitions filed by COMSAT and other parties seeking changes in the divided Commission's Domestic Satellite Services Order.

By a 4-to-3 vote, the Commission approved its basic Order in the protracted domestic satellite case on June 16. COMSAT requested first a stay in implementation of that Order, then filed for reconsideration of the Order asking the FCC to eliminate restrictions on the Corporation.

The June 16 Order highlighted a series of events in the long-pending issue of how to introduce satellite technology into the matrix of domestic U.S. communications services.

The Order adopted what an FCC Notice termed a "multiple entry" policy. In general, qualified applicants with the technical and financial ability were to be allowed to file for domestic satellite facilities. But the Order imposed severe restrictions in some areas, particularly on AT&T and on COMSAT.

The majority rejected outright the proposed seven-year lease agreement under which COMSAT would contract to lease bulk satellite capacity to AT&T, directing instead that if COMSAT desired to serve AT&T it provide such "wholesale" services to AT&T and other carriers under regular tariffs. The Order also imposed on COMSAT the option to choose between serving this "wholesale" market in a carrier's carrier role, or serving a "retail" market of all other customers through a multi-purpose system, but not both. Further, it restricted COMSAT's ability to serve off-shore points (Alaska, Hawaii and Puerto Rico).

FCC Chairman Burch, Commissioners Reid and Wiley, voted against the majority decision on the basic Order. Subsequently, one of the majority, Commissioner Bartley, retired, and was replaced in early July by new Commissioner Hooks.

Chairman Burch, joined by Commissioners Reid and Wiley, later is-

sued a dissenting statement. Mr. Burch attacked the majority Order as an attempt to "structure behavior largely by recourse to penalties and blue-sky models of pure competition."

"In my view," Mr. Burch said in the dissent, "the answer is to be found in an approach that affirms in essence the AT&T/COMSAT contractual arrangement but then attaches to it one critical condition: namely, that COMSAT, with its unique technical and managerial expertise, also provide satellite service to those entities who, lacking the initial nucleus of assured traffic, might be unwilling or unable to risk the huge investment necessary to launch satellite facilities of their own. As an alternative, COMSAT should be free to elect the route of an end-to-end retailer."

In its petition for reconsideration COMSAT urged the Commission to "approve the COMSAT/AT&T application, and to remove anticompetitive and artificial market divisions, so as to permit COMSAT to serve any market and customers of its choice, including specifically authority to provide the off-shore points with end-to-end services."

The Corporation disagreed with a majority conclusion that AT&T's ownership interest in COMSAT (29 percent of its stock and three of 15 members on the Board) somehow compromised COMSAT's domestic applications, or its ability to compete domestically with AT&T.

This is simply untrue, the Corporation said, referring to the many instances it had cited in earlier filings of its vigorous opposition and competition to AT&T in international communications over the last six years or more.

COMSAT further stated that if the Commission "is as concerned about AT&T ownership of COMSAT stock as the Order indicates, the Commission has at its disposal a variety of direct methods, including incentives and conditions to authorizations, to seek to persuade AT&T to end its corporate relationships with COMSAT."

Whatever the eventual outcome, COMSAT has emphasized that it intends to vigorously seek its share of the domestic satellite market, bringing to this market the experience and talents it has developed globally.

Net income up, second quarter dividend slated

COMSAT reported net income of \$6,070,000 or 61 cents per share for the second quarter of this year, compared to \$5,454,000 or 55 cents per share for the second quarter of last year. For the first six months of 1972, net income amounted to \$12,566,000 or \$1.26 per share, compared to \$12,145,000 or \$1.21 per share for the first six months of 1971.

Net operating income was \$4,886,000 or 49 cents per share for the second quarter of this year, compared to \$4,118,000 or 41 cents per share for the second quarter of last year. For the first six months of this year, net operating income was \$9,892,000 or 99 cents per share, compared to \$8,739,000 or 87 cents per share for the first six months of last year.

Revenues were \$25,618,000 for the second quarter and \$50,858,000 for the first six months of this year, compared to \$22,229,000 for the second quarter and \$44,163,000 for the first six months of last year. The increased revenues resulted from a gain in the number of full-time circuits leased by COMSAT to its customers. These numbered 2620 at June 30, 1972, a 15 percent increase over the 2280 of last year.

Operating expenses increased to \$20,732,000 (including income taxes of \$5,024,000) for the second quarter and \$40,966,000 (including income taxes of \$10,343,000) for the first six months of the year. This compared to \$18,111,000 for the second quarter of last year and \$35,424,000 for the first six months of last year. The increased expenses resulted primarily from higher depreciation costs associated with the INTELSAT IV series of satellites.

The second quarter net income was \$426,000 less than that for the first quarter of 1972. The decrease was primarily due to lower non-operating income.

At its monthly meeting on July 21, 1972, the Board of Directors declared the quarterly dividend of 14 cents per share, payable on September 11 to shareholders of record as of the close of business on August 11.

Domestic satellite chronology of events

Chronology of recent events in domestic satellite case:

- March 17: Staff recommendations of FCC's Common Carrier Bureau called for "limited open entry" policy. Among other things, the Staff report proposed that COMSAT be forced to choose between serving AT&T under a contractual lease arrangement or serving other customers in a multi-purpose system approach, but not both.

- April 19: COMSAT and other parties submitted written statements. COMSAT strongly objected to limitations recommended by the Staff.

- May 1 and 2: More than 25 parties presented oral arguments on the Staff proposals in two full days of hearings before the full Commission. COMSAT Vice President and General Counsel David Acheson further emphasized the Corporation's position, urging a policy of "genuine open entry" devoid of limitations.

- June 16: The Commission issued long-awaited Order in domestic satellite case on a 4-to-3 vote, modifying the Staff recommendations, but imposing a number of restrictions on COMSAT and others. It disapproved a proposed COMSAT/AT&T long-term lease agreement, instead limiting COMSAT to offering such "wholesale" or carrier's carrier services only under tariffs. It retained the Staff limitation requiring COMSAT to choose between the markets it would serve, and also retained restrictions on COMSAT serving off-shore points.

- June 30: COMSAT asked the FCC for a stay, and informed it that the Corporation would file a reconsideration petition asking for changes in the Commission's June 16 Order.

- July 13: Chairman Burch, joined by Commissioners Reid and Wiley, issued dissenting statement explaining their opposition to the June 16 Order.

- July 17: COMSAT filed for reconsideration, urging the Commission to allow the COMSAT/AT&T lease arrangement, permit COMSAT to serve all other customers and markets of its choice as well, and grant COMSAT authority to provide end-to-end service to off-shore points.

- July 19: The FCC postponed further action on the case until September, at the earliest.

10th anniversary of a unique piece of legislation

BY STEPHEN D. SMOKE

August 31 marks the 10th anniversary of the Communications Satellite Act of 1962.

This unique legislation represents COMSAT's birthright, its mandate from the Congress to establish a commercial communications satellite system, by itself or in cooperation with other countries, and a new hope for developing nations to bridge a centuries-old gap of isolation from world social, economic and cultural development.

The Act was forged in bitter controversy. Passage ultimately required the unusual exercise of cloture in the Senate to shut off filibustering opponents of the bill. The main issue was whether this promising new technology would be put to work for the benefit of all people by a private corporation owned by the communications carrier companies, or by a government agency. As a compromise, there arose the concept of a new kind of private enterprise which, of course, became COMSAT when it was incorporated the following February 1.

Whatever might be said about this legislation, before and after its enactment, it did set forth a practical approach for getting a big job done quickly and effectively. The Act placed numerous restrictions on COMSAT, but it did not specify the form of the international cooperation to be employed, nor on the technology itself. This gave COMSAT the flexibility it needed to achieve, in a very short time, national objectives which many thought to be overly optimistic.

One example of the advantages of the flexibility offered by the Act was demonstrated in the approach taken to establish international cooperation for the development of a single global system.

Since the transoceanic cable is a

■ *Mr. Smoke is a COMSAT Senior Information Officer.*



The Communications Satellite Act of 1962 was passed by Congress on August 27, 1962, and sent to President Kennedy, who signed it four days later.

point-to-point communications device, it had been traditional to establish cable facilities on a negotiable basis, that is, agreements between the communications entities of two countries. This confined communications paths to the economically developed countries.

The satellite, however, had the potential of serving many countries simultaneously, thereby opening the door to system development on a multilateral basis. Taking this new communications capability into consideration, and the attendant economic benefits as well, COMSAT supported the concept of an international joint venture in which all interested parties could participate in proportion to their use of the satellite facilities. Moreover, the facilities would also be available to all nations of the world without discrimination. This concept was as unique as the Act itself, and resulted in an unprecedented scope of international participation.

When the initial INTELSAT agreements were opened for signature in August 1964, 14 countries were signatories to the agreements. Worldwide interest, however, was strong, and today INTELSAT has 83 member

countries that account for most of the world's international communications.

Another example of the Act's flexibility related to selection of system configuration. When the Act was signed, the prevalent opinion favored low orbiting satellites, each providing only a few hours of service as they passed over expensive earth stations with a highly sophisticated tracking capability. Such a global system, requiring 18 to 24 satellites to serve perhaps seven regional earth stations, represented an investment approximating one-half billion dollars. This would have still kept a new technology largely in the hands of the economically developed countries.

Within a year of its incorporation, however, COMSAT ordered two synchronous satellites, and thus Early Bird became the forerunner of the present global system which makes it economically feasible for any country to share in ownership of the satellites, and also to have access to the high capacity INTELSAT IV satellites for so modest an investment as \$3 to \$5 million for an earth station of its own.

The freedom that the Act gave COMSAT to investigate different alternatives, to select the ones that held

the greatest potentials for public benefit, was, therefore, an essential element in the speedy development of international satellite communications.

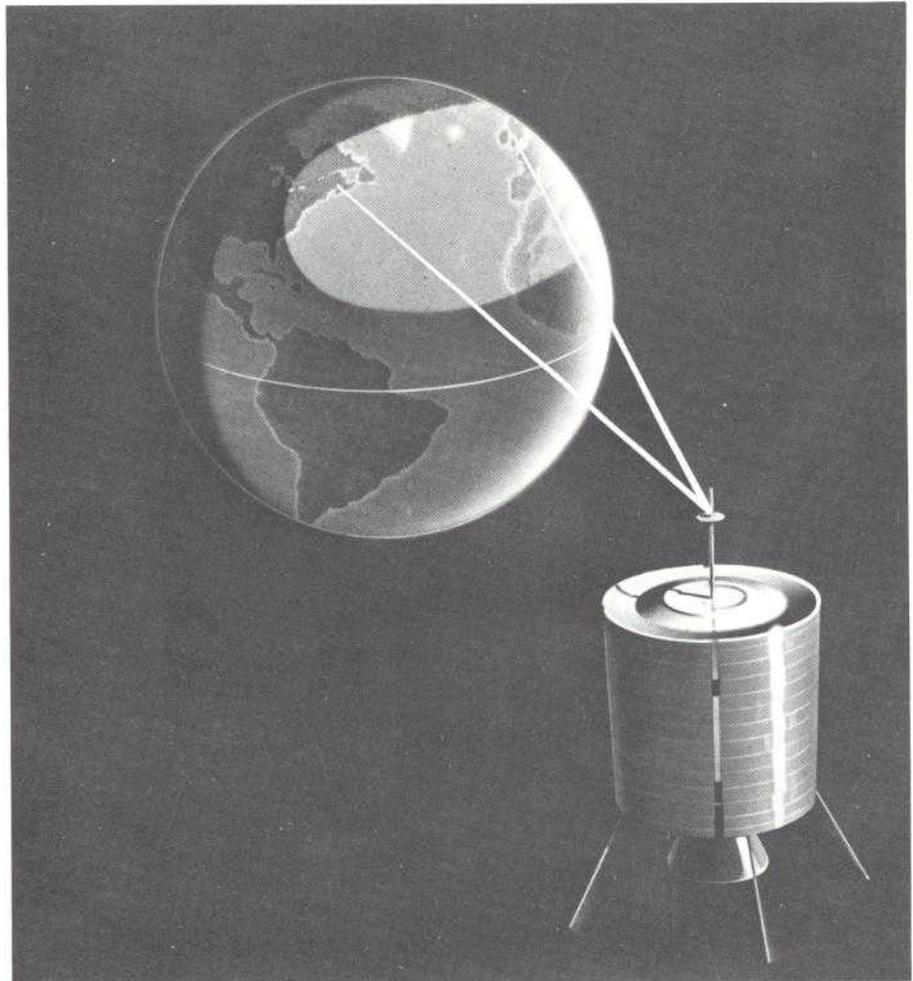
Today, just 10 years since passage of the Communications Satellite Act of 1962, a fourth generation of high capacity INTELSAT IV satellites, operating 24 hours-a-day over the Atlantic, Pacific and Indian Oceans, has replaced the initial global system of INTELSAT III satellites established in July 1969.

A total of 42 countries have already constructed 68 antennas at 56 earth station sites around the world. When Early Bird went into commercial operation on June 28, 1965, there were only four experimental stations in operation in the United States and Europe, and only two could communicate with each other at the same time. There was just one satellite pathway.

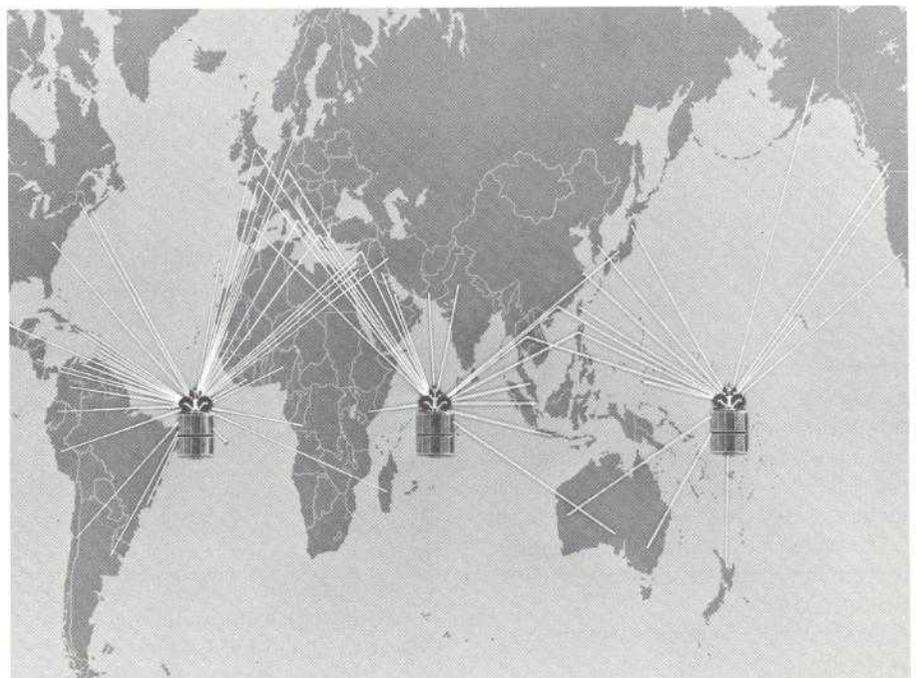
Since all earth stations within a satellite's area of coverage can now communicate directly with each other at the same time, there are some 200 satellite pathways among the 42 countries with earth stations, and 3200 circuits are being leased on a full time basis in the INTELSAT system. In fact, two-thirds of all international transoceanic communications are today going via satellite.

These achievements have had a profound impact on people of the world. In brief, one out of every six people on earth can see events of sufficient international interest on TV screens, as they are happening, "Live via Satellite." You can now place phone calls to some 30 countries in Latin America, Europe, Africa and the Mideast, as well as 20 countries in the Pacific area and get high quality connections in a matter of minutes. Moreover, computers are talking to computers with increasing regularity, and satellites will speed the day when you will be able to get the information and documents you want at the push of a button from data and facsimile information storage and retrieval systems in this country, and other countries as well.

But, after 10 years, the United States still does not have a domestic satellite system, and that is a subject of considerable contention, controversy and confusion.



Early Bird, the first commercial communications satellite, went into operation June 28, 1965, and provided one pathway across the Atlantic.



The global satellite system of INTELSAT IVs provides some 200 satellite pathways among earth stations in 42 countries.

Organizational changes announced

Several organizational changes were announced in June by Dr. Joseph V. Charyk, COMSAT President, who said the changes resulted from an examination of COMSAT's needs for the present and the future. He noted that the realignment of responsibility will improve lines of communication and enhance the Corporation's flexibility.

Among the changes are the transfer of the Computer Division and Systems Engineering to the Laboratories; the transfer of Earth Station and Spacecraft Implementation, including spacecraft technical control and celestial mechanics, to Operations, which becomes Communications System Management; the transfer of Purchasing and General Services to Management Review and Coordination, which becomes Administrative Services; the transfer of Internal Audit and Computer Management Applications to the Comptroller; and the transfer of Personnel to Corporate Relations, which becomes Corporate Affairs.

The following list of COMSAT officers shows present titles, which include changes that were made:

Joseph V. Charyk
President
David C. Acheson
Vice President and General Counsel
Lucius D. Battle
Vice President—Corporate Affairs
John A. Johnson
Vice President—International

James J. McTernan, Jr.
Vice President—Finance
Wilbur L. Pritchard
Vice President and Director,
COMSAT Laboratories
George P. Sampson
Vice President—Communications System Management
William H. Berman
Assistant Vice President and Associate General Counsel
Richard R. Colino
Assistant Vice President—International
Matthew Gordon
Assistant Vice President for Public Information
John L. Martin, Jr.
Assistant Vice President for Domestic and Aeronautical Satellite Systems
Sidney Metzger
Assistant Vice President and Chief Scientist
Lewis C. Meyer
Assistant Vice President—Administrative Services
Joseph H. O'Connor
Assistant Vice President—Financial and Economic Analysis
Martin J. Votaw
Assistant Vice President for System Implementation
H. William Wood
Assistant Vice President for Operations
Frederic M. Mead
Treasurer
Joseph L. Mahran
Comptroller
Robert B. Schwartz
Secretary and Counsel for Corporate Matters
Jerome W. Breslow
Assistant Secretary and General Attorney
Marvin R. Jawer
Assistant Secretary and Attorney



Mr. Pritchard

Pritchard elected vice president

Wilbur L. Pritchard, Director of the COMSAT Laboratories, has been elected a vice president of the Corporation. He was formerly an assistant vice president.

Mr. Pritchard joined COMSAT in 1967 as Director of the Laboratories, which has become an international center for the advancement of satellite communications technology. From 1946 until 1962, he was with Raytheon Company where his positions included Director of Range and Space Support Systems. From 1962 until 1967 he was with Aerospace Corporation as Group Director of Communications Satellite Systems.

Mr. Pritchard, an electrical engineer who was educated at City College of New York and Massachusetts Institute of Technology, holds numerous patents in electronics.



Mrs. Wells at the Tomb of the Unknown Soldier outside the Kremlin.

A comparison of the two summits

By FAY GILLIS WELLS

In the inevitable comparison between the two summit meetings, the Soviet Union comes out second best to the People's Republic of China in the communications book.

Although both summits marked a "first-ever visit of an American President", they were totally different in character. In the People's Republic of China it mainly was a carefully orchestrated ceremonial affair to re-establish a dialogue that had been lost for more than two decades. In the Soviet Union it was a hardworking summit with headline agreements signed every day, plus President Nixon's live television speech to the Soviet people.

Having agreed to the summit, the Chinese went first class all the way, installing a transportable antenna

■ Mrs. Wells is White House correspondent for the Storer Broadcasting Company.

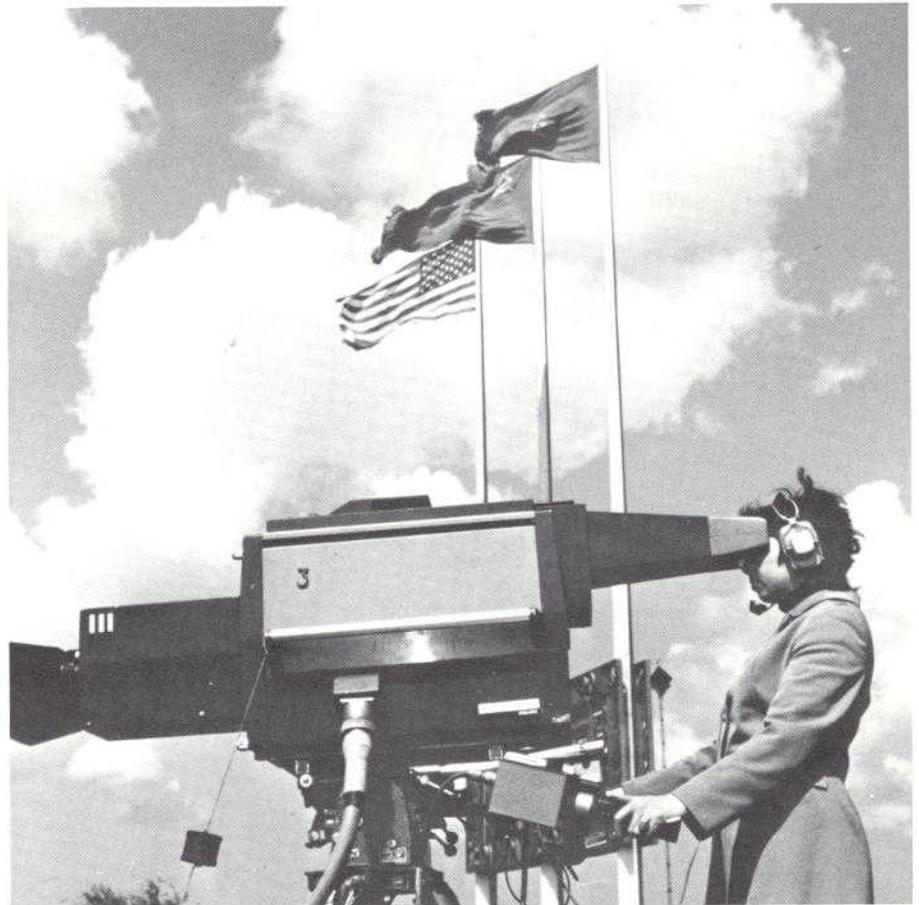
which permitted TV transmission to enter the satellite system virtually at point of origin. It made the big difference. Then the Chinese, smart enough to realize they didn't have the technical know-how, graciously surrendered control of the television coverage to the American technicians, and they came through the tube looking beautiful in living color. By contrast, the Russians had no direct access to a satellite system, so some of the picture quality was lost in the almost 2000 miles of transmission across Europe before the signal was relayed to the United States. The Russians built elaborate studios for the American networks out at their vast TV City, but they complicated things by insisting on handling all pool camera work. The quality of the voice feeds varied in ratio to the interference on the lines.

The third floor of Moscow's In-tourist Hotel was turned into a press center during the summit meetings. A large curved bar served as a font of information between the briefing

room and working area. The long distance telephones were set on tables at one end of the press area. Each phone was isolated by an open, three-sided plastic stand. The room was so noisy most of the broadcasters worked in the quiet of their rooms.

But reporters working in their rooms were out of touch with the press area, where rumors spread like wildfire. As all foreign correspondents were allowed on the third floor it was impossible to have briefings just for the White House Correspondents, so the President's News Director, Ron Ziegler, or his Deputy, Jerry Warren, would pass the word to small groups of reporters who would pass the information on to other White House media. Any resemblance to the original Ziegler statement as it was received by the last correspondent was purely coincidental. And so the misinformation was compounded.

In the People's Republic of China the American correspondents were, for the first time, members of the official Presidential party; and they



Television of President Nixon's visit to the Soviet Union was widely viewed in both Europe and the United States.



The third floor of the Intourist Hotel was turned into a press and communications center.

found that this is the only way to go. The Chinese were perfect hosts and the correspondents reveled in their status as guests at all the official functions attended by President and Mrs. Nixon. Nor will any of the White House Press forget the members of the Shanghai Central Committee walking into their unlocked rooms in the middle of the night to deliver their parting gift of 20 pounds of assorted candies in pink and green brocaded boxes. It couldn't have been sweeter. By contrast, the summit in Moscow was just another hardworking overseas trip, with no guest privileges. We were allowed to buy tickets to watch the Nixons watch the ballet "Swan Lake." This we wouldn't have minded, if we hadn't been to China first.

In both these communist countries we saw and did what the officials wanted us to see and do. The Chinese took the persuasive, persistent, inscrutable approach; the more aggressive Russian security kept up their eyeball-to-eyeball confrontation with the press throughout the trip. One American reporter, who recently covered the Soviet Union for several

years, put in 40 phone calls to seven of his Soviet "friends." Not one was home when he called, at various times during the day and night, nor did any one return his calls. After four days he gave up trying to reach his friends.

The special dining room in the Peking Hotel, kept open around the clock, plus bowls of tangerines and candy in our rooms, proved the old adage "the way to a man's heart is through his stomach." In Moscow, the dining room closed at 11:00 p.m. and didn't open for breakfast until in the morning, nor were there any tidbits, compliments of the hotel. Because we have had diplomatic access to the Soviet Union for the past 40 years, there wasn't the need here of "getting to know you" that there was in China where we haven't spoken officially for more than 20 years.

Aside from his one-day flight to Leningrad, President Nixon left the Kremlin only three times: to lay a wreath at the Tomb of the Unknown Soldier just outside the Kremlin wall; to attend a delightful performance of "Swan Lake" and to go to a dewy-eyed, jampacked Baptist church serv-

ice. This delighted the Russians for it focused on the "religious" freedom in the Soviet Union.

By contrast, Pat Nixon was a typical tourist, on the go all day long, accompanied by the first ladies of Russia. She went to the ballet and language schools, the 22-story Moscow University, a far-out Soviet fashion show, toured the world-famous subway, the renowned circus, the Armory Museum and the treasured collection of modern Soviet diamonds. But nowhere did she mingle with the ordinary Russian people. The first ladies of the Soviet Union normally are not seen in public, so the security guards were understandably apprehensive about the jostling reporters surrounding them. Mrs. Nixon tried to reassure them that it is all part of being First Lady but the Soviets never were convinced.

The sophisticated correspondents who had covered Presidents all over the world breathed a sigh of relief on landing in Tehran. After eight days of restrained people, heightened by overcast skies, it was a joy to see a half million laughing, waving, cheering Iranian people in the sunshine. Never mind that there were three terrorist bombings in Tehran the next morning. (None was aimed at the President, according to Iranian officials.) But President Nixon had to fly to Communist Poland for his first opportunity on the trip to "press-the-flesh." He was mobbed when he stopped at the Tomb of the Unknown Soldier in Warsaw, and he loved every minute of it.

The culmination of communications for this second summit was the dramatic live pickup of the President's helicopter, spotlighted at the Capitol, as he went to report to the Joint Session of Congress on the Moscow meetings—the meetings that many a pundit predicted would never happen, especially after the President's defiant mining of the North Vietnam ports.

President Nixon brought back no ping-pong teams or giant pandas from this Moscow summit, but he did bring back a very important fabric of interwoven agreements he hopes will hold the US-USSR dialogue together until the two superpowers can negotiate a realistic, live-and-let-live policy for peace.



An old picture of Captain Burnham.

Ancient landmark adds history to launches at Cape

BY LARRY G. HASTINGS

At 21:53:04:069 hours, June 13, 1972, Atlas Centaur Number 29 lifted off from launch Complex 36 at Cape Kennedy, Florida, carrying the fourth in the INTELSAT IV series of satellites towards its destination over the Indian Ocean.

The count-down, for both rocket and spacecraft, was the most nearly flawless, to date, of any INTELSAT countdown. The lift-off was the first daylight launch of the series. A/C 29 rose into the blue Florida sky looking like a white needle trailing a long gold and white yarn.

■ *Mr. Hastings is a COMSAT senior information officer.*

All launch photos look much the same—rocket, smoke, steam and flame. In an effort to obtain a different angle, a camera was set to cover the liftoff so that the ancient landmark, the Cape Canaveral Lighthouse, was in the photo.

The photo and accompanying text would not have been complete without digging into the history of the tall, black and white structure.

The Kennedy installation has a split personality. The Kennedy Space Center is NASA-operated while Cape Kennedy is under the direction of the USAF's Eastern Test Range. The dividing line, running through the huge facility, is the Banana River. The Cape Canaveral Lighthouse stands at the tip of Cape Kennedy—the Air Force section. Andrew J. Wood, Chief of the Public Information Division at the administrative headquarters of the Eastern Test Range at Patrick Air Force Base, Florida, was able to provide much information about the old structure.

In 1843 this point was selected as a place of protection and safety for seafaring men and vessels as they sailed along these coastal waters. For many years the waters of the Indian River and the Banana River which adjoins the Cape and the vast ocean to the east were the only means of transportation up and down the coast. Lighthouses played a most important role—guiding the seafarer and leading him to safe and protected waters.

One of the first lighthouses to be built along that coast was at Cape Canaveral. The original lighthouse was constructed of brick, with construction beginning in 1843 and completed in 1847. It was not until 1853, however, that a permanent lighthouse keeper—Captain M. O. Burnham—was to arrive and stay.

At the start of the Civil War, the Secretary of the Confederate Navy ordered all lighthouses on the southern coasts to be dismantled. This order was issued to discourage Federal ships from landing troops in strategic places, and to avoid helping in the Yankee blockade.

Captain Burnham, following the orders of the Confederate Government,

dismantled the lighthouse mechanisms—the valuable prisms and mirrors, packed them in wooden crates, and carried them to his orange grove located on the edge of the Banana River. At the end of the war, he turned the lighthouse equipment over to U.S. Government officials.

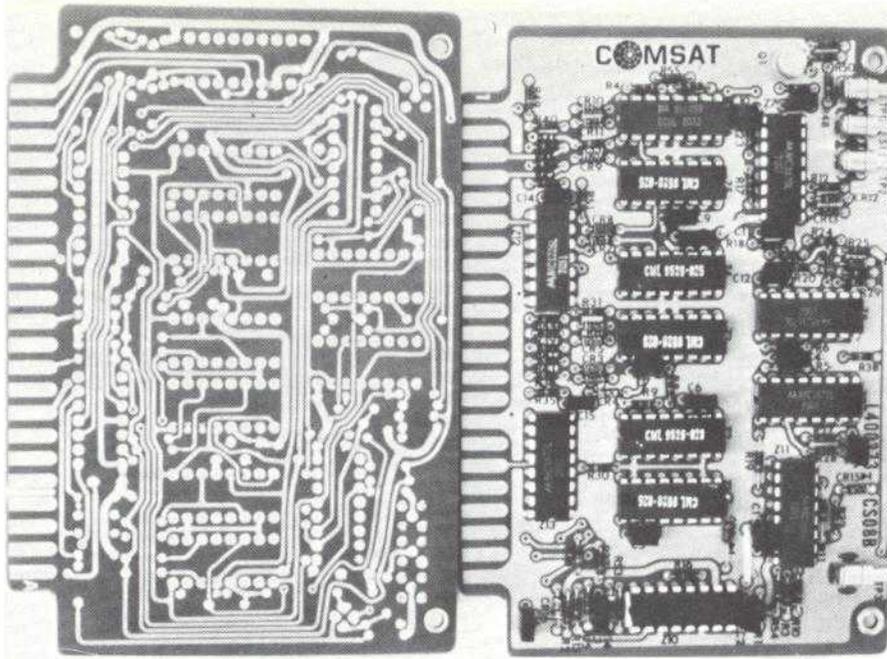
In 1868 a new lighthouse was built—a wooden structure—and new mechanisms were installed, re-establishing the Cape Canaveral Lighthouse. The new mechanisms were made in France; the light was now a more brilliant one, for kerosene replaced the formerly used whale fuel oil. Eventually the wooden lighthouse structure proved inadequate when weathering and termites took their toll. The structure was reinforced by steel plates and faced with brick and concrete.

In April 1886, the sea came almost to the base of the lighthouse, so Congress appropriated funds to move the beacon 1½ miles inland to its present location. Movement of the tower took about 18 months during 1892-1893.

Captain Burnham remained as keeper of the Cape Canaveral Lighthouse until his death, having served it well through war and peace for a period of 30 years. He, and later his daughter and son-in-law, were buried on the edge of his orange grove overlooking the Banana River, now part of Cape Kennedy.

The lighthouse at Cape Kennedy still stands, manned by a Coast Guard crew and equipped with modern radio and scientific equipment. It is no longer an isolated station, but the center of one of the United States Government's most important installations. Captain Burnham has been replaced by new pioneers, men who talk of other planets and walks on the moon, and who look to the heavens instead of to the sea.

Today Cape Canaveral, renamed Cape Kennedy, still serves as a base of operations for safety. Its scope has increased from just the safety of the seafarers to that of the entire nation and people everywhere. The historic lighthouse is, indeed, a witness to much, from the pre-Civil War days to the launching of man's first men on the moon.



A typical "C" series board.

In search of faster circuits — and still faster

By PRADMAN KAUL

Engineers with an eye to the future are designing solid-state circuits capable of higher and higher speeds, speeds beyond human comprehension. Work at COMSAT Laboratories is steadily pushing circuit speeds upward to 300 million bits of digital information per second and even higher. At rates like that, the entire *Encyclopaedia Britannica* could be transmitted in a few seconds.

Why? Just to show that we can do it? Who needs a whole *Britannica* every three seconds?

Actually there are several very practical reasons for all the activity in this area going on at COMSAT and elsewhere.

The frequency bands allocated to satellite communications are limited, while traffic over existing systems continues to grow and new systems are being planned and built. By sampling

■ Mr. Kaul is a member of the technical staff in the COMSAT Labs Technology Division.

the signals at regular intervals and transmitting the samples in sequential bursts, several telephone conversations can be sent over the same frequency. The higher the bit rate, the more conversations with no loss of signal quality. This is the idea behind time-division multiple access systems like INTELSAT's TDMA-2 (being developed at COMSAT Labs), which operates at a comparatively slow 50 million bits per second.

Converting analog signals to a stream of binary numbers yields a "cleaner," more noise-free signal at the receiving end for less electrical power. Clearly this is an advantage in satellite communications, where the spacecraft generates an adequate but still limited amount of operating power. Higher bit rates allow for more redundancy and better error coding, hence an even cleaner signal.

Solid-State Circuitry

Ultra-high-speed signal processing would be impossible in conventional vacuum tube systems. Microminiaturized solid-state components made of semiconductor materials—the best known is the transistor—operate at much higher speeds, with higher reliability, and dissipate less power. The speed comes because the signals travel much shorter distances both within and between the tiny devices and

therefore have less delay between operations.

Digital circuits can work even faster because they need only to respond to two possible states, which may be called on and off, or 1 and 0. From repeated manipulations of these two states, digital systems instantly carry out any kind of logical or numerical operation for which they were designed.

The Laboratories' developmental effort in digital circuits is concerned with both the circuits themselves and with their associated hardware, like connectors, cables, and coolers. Special emphasis is laid on the minute connections between components of the circuits, since no signal processing "work" is being accomplished there—the signals are simply in transit, and a more efficient route might save a few crucial billionths of a second.

A Modular Approach

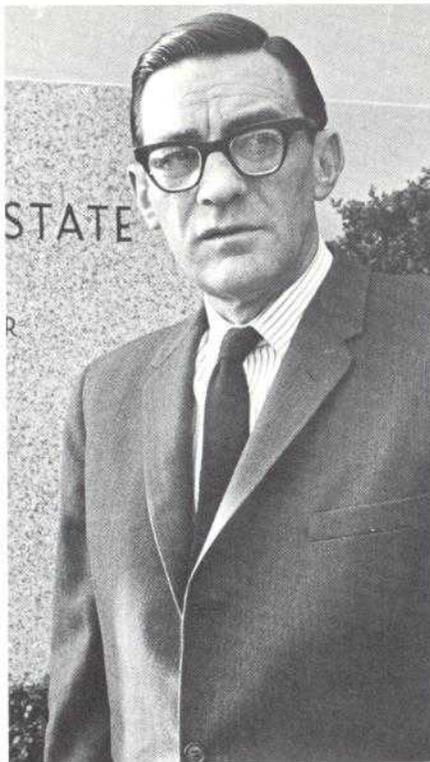
Three series of digital logic modules are being developed at the Laboratories. The modular approach means that reliable circuits of known performance characteristics are available off-the-shelf for inclusion in new systems under development.

The "C" series is a group of about 90 different two-sided printed circuit cards which can be used up to 150 million bits per second. These circuit cards have been designed to incorporate tiny integrated circuits made by Motorola and Fairchild.

For speeds of between 150 and 250 million bits per second, the "D" series of four-layer fiberglass boards has been developed. The integrated circuits used in the "D" series are from Motorola's MECL III flatpack family.

The most recent development, the "E" series, operates at above 250 million bits per second. An eight-layer ceramic substrate is the basic building block for this series. Ceramic was chosen because the short interconnect lengths required for these speeds create a density of heat-producing components and ceramic can tolerate these kinds of temperatures.

How high will logic speeds eventually go? Nobody really knows, but some components already in existence are capable of a billion bits per second.



Mr. Hensley

Reflections on the Moscow summit

BY STEWART HENSLEY

Covering President Nixon's visit to China was high adventure—a sort of Odyssey into the unknown. Reporting his subsequent trip to the Soviet Union was more in the category of hard work, dealing as it did with more substantive discussions of specific agreements such as the limitation of strategic nuclear weapons.

The Moscow Summit Conference was not without its dramatic aspects, however. There certainly was an element of the bizarre in the spectacle of the President exchanging public pleasantries with his Russian hosts and negotiating profitably with them in private while Soviet merchant vessels were imprisoned in North Vietnamese harbors by mines sown by U.S. warplanes and warships.

■ *Mr. Hensley is chief diplomatic correspondent for United Press International.*

Travelling with the President of the United States from the Great Wall of China to the fastnesses of the Kremlin—all within a period of about three months—has to be an unforgettable period in any newsman's life.

In retrospect an air of unreality lingers over both pilgrimages, although the diplomatic accomplishments appear to have been very real indeed. The world now is aware of most, if not all, of the bargains struck and it remains only to be seen whether the agreements will be implemented as envisaged.

When asked to give an overall personal impression of the two visits I feel much as if I had been commissioned to execute a Diego Rivera style mural with a child's box of watercolors.

Looking back on the two Presidential pilgrimages, the most vivid recollections emerge as vignettes.

There was the night in Peking when Premier Chou En-lai honored the President and those accompanying him at a lavish banquet in the Great Hall of the People on Tien-an Men Square. The sight of the President and the Premier toasting each other in fiery mao tai beneath huge Chinese and American flags while the band of the People's Liberation Army played "America the Beautiful" was unforgettable. It washed away—for the moment—bitter memories of the Korean conflict and 20 years of Cold War between Washington and Peking.

And I do not expect, within the foreseeable future, to again be the guest of affable Secretary of State William Rogers at a small dinner atop the 21-story Rossiya Hotel from which we looked down into the Kremlin and watched the sun set across the Moscow River.

Another memorable experience in Moscow was Presidential Adviser Henry Kissinger's briefing for American newsmen after the signing of the strategic nuclear arms limitation agreement.

It was held at one o'clock in the morning in the eerie gloom of the basement nightclub of the Intourist Hotel on Gorky Street from which revelers had been hastily evicted a few minutes earlier by Russian authorities.



Television cameras roll as President Nixon arrives in Russia.

Kissinger pontificated from behind a makeshift lectern in front of a mosaic panel of colored glass lighted from behind by intermittent flashes which made the dove of peace—the central figure of the pictorial—appear to be dive-bombing the Kremlin.

U.S. Secret Service agents lounged in the chairs recently vacated by the nightclub orchestra while White House press officers guarded the portals to see that no strangers got in and no reporters escaped until Kissinger had wearily answered the last weary questioner.

American reporters who covered both the Chinese and Russian trips found similarities in the treatment they received in the two countries but also some striking differences.

Chinese and Russian newsmen, as well as officials in charge of arrangements in the two communist capitals, did everything possible to ensure the physical comfort of the visiting American journalists.

The Chinese, however, in explaining their country, their government and its actions, displayed an ideological fervor far more intense than that of the Russians.

The reasons, I think, are rather obvious. The Soviet citizen, some 55



Newsmen take notes during one of the many briefings.

years after the October Revolution, assumes the ideological infallibility of his government—or at least its permanence—and the built-in limitations on the individual but doesn't bother propagandizing you about the glories of the State and its leaders.

The Chinese, by contrast, evince a gung-ho enthusiastic attitude toward what they call the continuing Revolution and appear to throw themselves into their state-oriented jobs with great abandon.

Their ideological fervor also owes much, I assume, to the fact that it was only 22 years ago that the Communists completed their conquest of the mainland. And ideological enthusiasm undoubtedly was refreshed, as Mao Tse-tung intended it to be, by the operations of the Red Guard during the recent Cultural Revolution.

The Chinese reporters and scholars who served as guides and interpreters were somewhat aloof during the first 24 hours, apparently not quite certain how much affability was in order. However, after the official press gave widespread publicity to Nixon's arrival and his initial activities, they loosened up and became interesting companions. However, they had a tendency to retreat into the "sayings" and "thoughts" of Mao Tse-tung whenever the conversational going became somewhat controversial.

Our relationship with the Russian newsmen in the Press Center on the third floor of the Intourist Hotel in

Moscow was quite different. Among them were many we had known rather well in Washington and various foreign capitals over the years and there was no barrier to free and easy conversational exchange from the beginning. Russian reporters were particularly helpful in providing advance notice of scheduled events, often coming through with the information before the White House officers were able to provide it.

American newsmen generally felt Russian security was much more heavy-handed and obvious than the Chinese variety. However, in extenuation of the Muscovite gendarmes it must be noted that they faced more difficulties than did their Chinese counterparts.

Soviet security officers had to deal with a White House press contingent of more than 200, whereas the group of reporters visiting Peking was limited to 78.

Also, it is much easier to keep a westerner under surveillance in Peking—where he stands out rather distinctly—than in Moscow.

I found that getting into and out of the Kremlin to cover certain ceremonies was a rather complicated process, even when accompanied by a White House press officer. While the Chinese were probably just as suspicious of us as the Russians were, the Russians made it more apparent.

Reporters following Pat Nixon's sightseeing trips complained about

the heavy-handed methods of the Soviet security force. But it appeared to me no rougher than the municipal and Federal security operations in the United States during the late Nikita Khrushchev's two-week tour of America in 1959 and his 1960 shoe-banging visit to the United Nations.

The Intourist Hotel, where we stayed in Moscow, and the Hotel of the Nationalities in Peking are both good, comfortable hostleries. They are, of course, government-owned and operated. The White House picked up all the bills and then recovered from the home offices of the correspondents. The Communists think it's tidier that way.

I would have to say that I found the Chinese food far superior to the Russian; but then I always have, so that was no surprise.

The Chinese, in addition to the delicious lunches and dinners they served, were willing and able to whip up an excellent western-style breakfast of fruit juice, ham or bacon and eggs, hot toast and truly excellent coffee.

After one experience with an Intourist breakfast of sliced cheese and ham, cold toast and a decidedly chilly soft-boiled egg, I made my breakfasts of bread, caviar and black coffee—no great hardship.

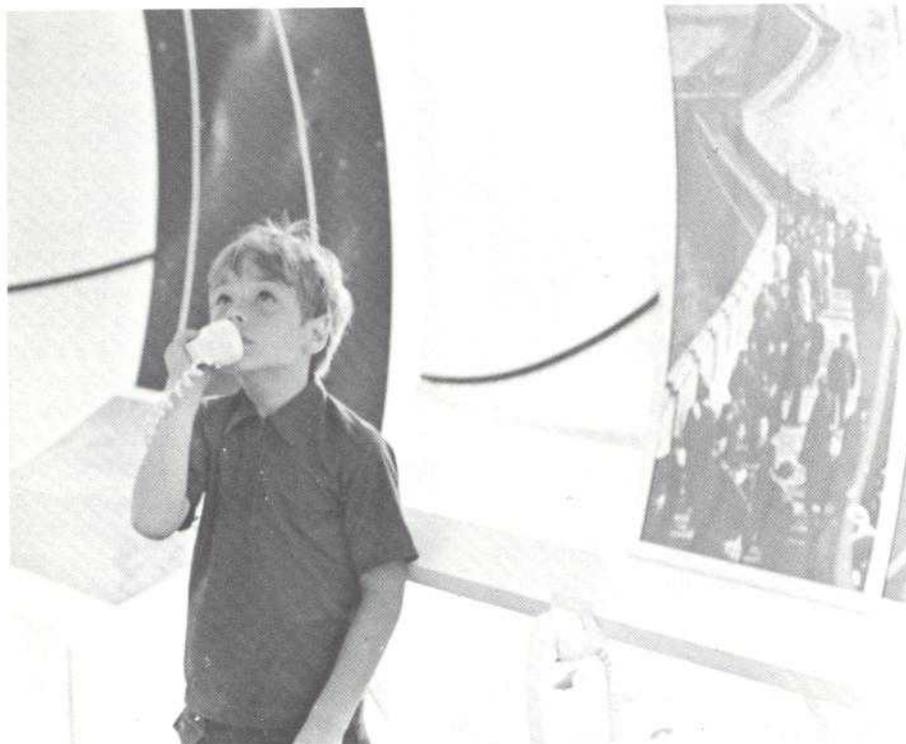
Russian lunches and dinner were neither good nor bad, as a rule—they were simply mediocre, except for a few excellent fish dishes and an excellent and nutritious fish and vegetable soup flavored with lemon and called "Solianka." They don't compare with the Chinese—but then, in my opinion, no cookery can.

As a final note, we found in China that the heavy hand of the state and the security arrangements were much less obvious in Hangchow and Shanghai than in Peking. In Russia, it was the same. There was a warmer and easier feeling during our 24 hours in Kiev than in Moscow.

Maybe there's something about national capitals that causes people in general and the government in particular to be more "up-tight." It is possible that foreigners visiting the United States find a similar difference between Washington and cities elsewhere in the country.



Some of the 20,000 people who visited COMSAT's exhibit during the first weekend that it was operational.



A young tourist listens to the COMSAT story with wide-eyed attention.

COMSAT installs permanent exhibit at space center

While COMSAT is already well-known at Florida's Kennedy Space Center, it will now become even more familiar to the hundreds of thousands of tourists and vacationers who annually visit the sprawling complex. COMSAT has installed a large permanent exhibit in the visitor's information building located at the Center's main gate.

The exhibit was installed in time for the INTELSAT IV launch on June 13. It immediately began to attract many visitors. The Kennedy Space Center said over 20,000 people visited the display the first weekend that it was operational.

Dr. Kurt H. Debus, Director of the Center, said in a letter to COMSAT President Dr. Joseph V. Charyk: ". . . I want to thank you for this contribution to our public education program. Public visitation has increased substantially in the last nine months, due in part to the Disney World enterprise 50 miles from the Center. We conservatively estimate that the COMSAT exhibit will be viewed by more than 1,500,000 visitors this year. Since the daily bus tours became available to the public in July 1966, well over 5,000,000 visitors have come to the Center from the 50 states and 70 foreign nations, many of which are represented in the Consortium. The exhibit graphically and dramatically portrays the application of space technology to international communications and is ideally suited to our requirements."

The exhibit was designed and built under the direct supervision of Allan Galfund, a COMSAT Senior Information Officer.



Owen awarded the Jordan Star of King Abdullah

Donald R. Owen (left), Director, Technical Advisory, International, shows Robert W. Kinzie, Director, INTELSAT Affairs, International, the award which was presented to Mr. Owen by the Jordanian Government on the occasion of the inauguration of the earth station at Baqa. The citation which accompanied the medal, known as the "Jordan Star of King Abdullah," emphasized Mr. Owen's personal contribution to the success of the project.

Highlights of ICSC actions at 59th meeting

The Interim Communications Satellite Committee, governing body of INTELSAT, held its 59th meeting in Stavanger, Norway, from June 21 to 28 with the Norwegian Telecommunication Administration as the host for this meeting.

Eighteen members, representing 48 of the 83 signatories were present.

Among its actions, the Committee:

- Elected Mr. Bernhard Seidel of the Federal Republic of Germany as its Vice Chairman for a term of one year beginning July 1. Mr. Ernst Eliassen had been elected chairman at the preceding meeting.

- Instructed the Manager to complete by the end of October selected portions of the INTELSAT IV follow-on studies to allow the Advisory Subcommittee on Technical Matters adequate time to evaluate the studies and

to advise the Committee so that a timely decision can be made (perhaps by the end of 1972) among the specific alternative means of meeting INTELSAT's capacity requirements for the mid-1970s. The alternatives include procurement of (1) more INTELSAT IV satellites, (2) modified INTELSAT IV satellites, or (3) "early version" INTELSAT V satellites.

- Approved an extension to October 6 of the delivery date of the extended capacity INTELSAT IV study being conducted by Hughes, and decided to visit the West Coast facilities of Hughes and Lockheed immediately preceding the 61st meeting of the Committee (beginning October 16) to discuss the results of the INTELSAT IV follow-on program studies being conducted by these companies.

- Adopted a charge of one unit at each end for a point-to-point two-way circuit with a capacity of up to 64 kilobits per second using single channel per carrier PSK modulation, provided that such circuits use no more

power and bandwidth than a standard 4 kHz satellite circuit in an INTELSAT IV satellite. The Committee also approved a schedule of charges for less than 24-hour use of the space segment for purposes other than television such as program channels.

- Approved an increase in the SPADE terminal memory from 8000 to 12,000 words, and instructed the Manager to implement the program.

- Authorized the Manager to award a development contract at a price not to exceed \$90,000 for a wideband polarizer/orthomode transducer, and to conduct the cross polarization experiment proposed by the Advisory Subcommittee on Technical Matters.

- Requested the Manager to prepare a study on the use of small earth stations in the INTELSAT global system, including consideration of the effects of using small earth stations on orbital arc utilization.

- Authorized the relocation of the Indian Ocean INTELSAT III, F-3 at a nominal position of 60 degrees East longitude as a spare in orbit for that area, after the new Indian Ocean INTELSAT IV goes into commercial operation, and to file frequency assignment notices with the IFRB for this new position.

- Granted initial approval to the Burum (Netherlands) and Lake Cowichan (Canada) standard earth stations for access to the INTELSAT system.

- Approved the Reunion (France) and Adak (United States) non-standard stations with a rate adjustment factor of 2.5 for telephony service and with no rate adjustment factor for television service on the condition that no additional power would be utilized.

- Approved free use of the Pacific INTELSAT IV by the COMSAT 16-foot station for tests and demonstrations on ionospheric scintillation measurements at 4 GHz signals for a period of approximately two months (ending no later than October 15), after the current Alaskan demonstrations are completed.

The next ordinary meeting of the Committee, the 60th, will begin on Wednesday, August 23, in Washington, D. C.



The town of Stavanger overlooks this small lake.

PHOTOS BY ELLEN HOFF

Norwegian town welcomes ICSC delegates

BY ELLEN HOFF

The ICSC, at the invitation of the Norwegian Telecommunications Administration, held its 59th meeting in Stavanger, a town of approximately 50,000, on the southwestern coast of Norway.

Stavanger's primary industries are shipping and fishing, and it is especially famous for its Norwegian sardines. Stavanger is fast becoming a tourist center as it is the seat for Rogaland County, an historic area famous for its role in the unification of Norway into a single kingdom. The day before our arrival, the King of Norway, Olav V, took part in ceremonies celebrating the 1100th anniversary of this unification. A display of Viking artifacts at the Stavanger museum gave insight into the early history of the county and included an old Celtic brooch brought back to Norway by

■ Mrs. Hoff is a research assistant in *International*.

the Vikings, who reversed it and covered it with their designs.

The town of Stavanger has been carefully and admirably developed. The older quarter by the harbor, with its wooden houses and cobblestone streets, has been carefully preserved by law. As in Copenhagen's famous shopping area, cars are banned from the streets and one can walk through open-air markets that sell everything from flowers to coffee mugs. Between the main flower market and the small lake in the town's center is Stavanger's stone cathedral, which was constructed in about the year 1100. (The cathedral's most cherished relic, according to its guidebook, is Saint Swithin's arm.) A few blocks away rises a L'Enfant Plaza-like modern shopping and hotel complex. The hills on both sides of the lake are covered with old wooden houses, with their Victorian windows and slate roofs intact, every window replete with copper-potted geraniums.

The first hint of the Norwegian summer is evident long before one reaches Stavanger—halfway across the Atlantic there is ample sunlight in the plane to read. In fact, it really never does get dark in Stavanger during the summer. Between 11:00 p.m. and about 4:00 a.m. there is a twi-

light, which the Norwegians call the 'blue hours,' then sunlight again. The second trait of Stavanger's summer greeted us at the airport—pouring rain. Throughout the meeting week, sun and rain mingled with almost tropical regularity.

The Norwegian language proved quickly unspeakable to most visitors, but communication was not difficult as most schoolchildren learn English as a second language. In addition, the Norwegian staff at the meeting was of invaluable assistance in aiding us with competent translation services and in maintaining telephone and telex communications with Washington. Signs and announcements soon became less complicated, 'privat parkering,' for example, being quickly recognizable as the days went on.

The committee began its work on Wednesday, June 23. Because of the long daylight hours there was time after the long sessions to explore the town, including several excellent fish restaurants, where we found fresh anchovies and dried meats prepared according to recipes handed down from the Vikings.



Dr. Burton I. Edelson, a member of the Manager's staff, stresses a point as he prepares for the meeting.



Members of U.S. and Manager's staff (left to right) Janet Tingley, Irving Goldstein, Edward Wright and Joe Pelton meet to discuss an agenda item.

June 23 is 'Midsummer Night' in Norway, a celebration to mark the longest day of summer. Our hosts provided a sightseeing boat which left Stavanger Friday night for a tour of the island-studded fjords around the town. Traditionally, families light bonfires along the fjord shores on Midsummer Night, and our boat passed many of these signal fires. After an hour's ride the boat docked at one of the rocky islands, and all climbed to its top for a remarkable and delicious mountain picnic.

Saturday, there was a bus trip to the impressive Rogaland radio tower, which maintains shortwave communications with the Norwegian merchant fleet, and covers a section of the Norwegian coastline on medium and short wave. Luncheon was served in the town of Byrne where we were greeted by a most competent school band. The Norwegians are very interested in music, and many schools have bands which travel through the country giving concerts.

A folk music and dancing demonstration followed, including a concert on a "double decker" fiddle. Only the top strings of the fiddle are played, but the lower ones resonate from the vibrations, to produce unique harmonies.

The bus ride back to Stavanger was

impressive, beautiful and too short. The country is mountainous with small farms tucked among the rocks. We were told that it is not the total acreage of one's farmland that is valuable in Norway but rather the amount which has been cleared of boulders. As a result, the vast majority of farms are quite small and are run by a single family. There are "five generation" fields, where five generations of a family have worked to clear cropland. Not many houses are built of these stones, because they are too difficult to work with and timber is abundant. Stone fences similar to those seen in New England are common, however. The roads curve along mountain tops overlooking the fjords and are often bounded by small trout streams.

Sunday, there was a boat trip through the fjords, to "Utstein Kloster" at Mosteroy. The Kloster is one of the best preserved monasteries in Norway. In a land of primarily wooden buildings, it is impressive as it is made entirely of stone, with walls often four and five feet thick. The bell tower is reached through the original winding stairway less than four feet in diameter, with each step well-worn down in the center. The view across the rocky island-top to the fjords was well worth the careful climb.

After a luncheon of salmon and Norwegian pastries (the many-varied pastries merit serious exploration as do the famous open-faced sandwiches) the boat ride continued through the Lyse Fjord to "Prekestolen" or Pulpit Rock. This cliff soars in a vertical face almost 2000 feet above the water. It is possible to drive or walk up the back of Pulpit Rock but few make the effort as there are no guard rails on top.

The trip back to Stavanger let us see more of the fjord country. Along the shores were many small summer houses; most people have a weekend house near the water and consequently the towns are nearly empty on Saturdays and on Sundays as everyone takes to the water. Impressively, the inhabited islands have electricity from the mainland, and our boat passed under several cables strung between the cliffs on either side.

The Committee reconvened Monday morning and continued in session through Wednesday, June 28.

Philippines host global traffic meeting

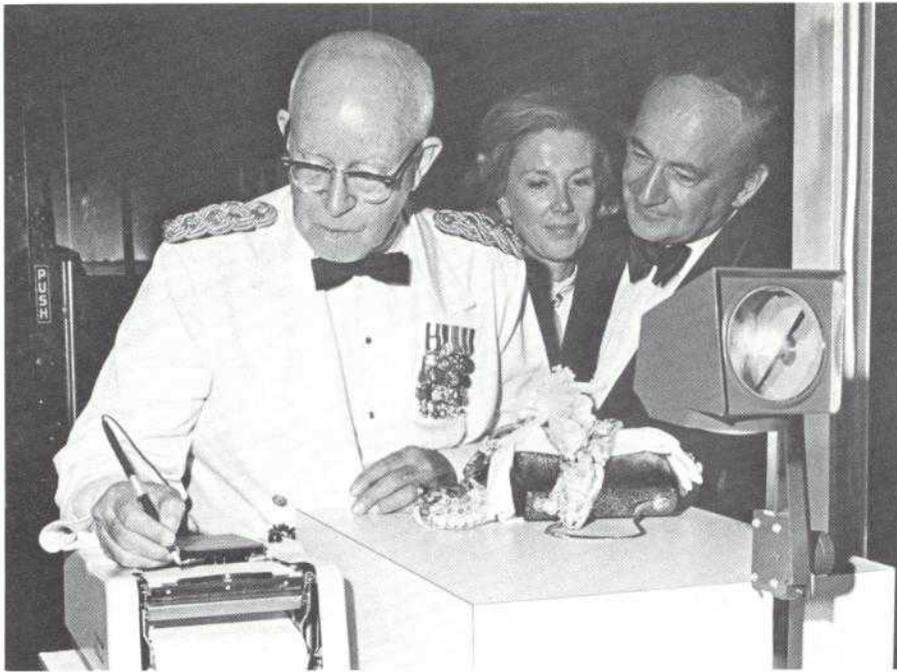
The Operations Representatives Traffic Subgroup for the Atlantic, Pacific and Indian Ocean Regions met in Manila, Philippines, from May 16 through May 19.

Fifty-four delegates representing 25 administrations including COMSAT as Manager discussed operational and contingency plans for the 1972-1976 time period.

Major agenda items reviewed and noted by the delegates in attendance included regional earth station implementation schedules and future traffic and preassigned circuit requirements.

The Manager also reviewed the status of SPADE and requested the various administrations' best estimates of future needs to be satisfied by the SPADE system.

The conference concluded with all delegations thanking the Philippine Administration for hosting the meeting, and especially for the hospitality and courtesies extended to the delegates during their stay in Manila.



"This is really an advance in communications."

General of the Army Omar N. Bradley (left) writes around the world, "via satellite", as COMSAT President Dr. Joseph V. Charyk and Mrs. Charyk watch. This demonstration was part of the 80th birthday tribute to General Bradley which was recently held at L'Enfant Plaza, sponsored by the Association of the U.S. Army.



Ball guests write around the world via satellite

June Burton, Executive staff, presents a souvenir brochure containing a message sent around the world to Mr. and Mrs. Percival F. Brundage, guests at the Opera Ball. The setting for this annual black tie dinner dance was a huge yellow and white tent at the west end of L'Enfant Plaza. COMSAT participated in the event, which was sponsored by the Washington Opera Society, by inviting guests to "write around the world via satellite."

Staff members awarded eight patents

Eight patents have been issued recently for inventions resulting from work done by members of the COMSAT staff. Three of the patents were awarded to one inventor, William G. Schmidt of the Labs.

The Corporation owns the patents and retains all rights; however, under COMSAT's patent incentive program, the inventor is entitled to a cash award. Recognition is also given to the inventor by having his name appear on the particular patent. The following is a list of the inventors, the patent titles, and a brief description of each invention.

- **O. Gene Gabbard** (former COMSAT Labs employee) and **Tadahiro Sekimoto** (former INTELSAT nominee): Method and Apparatus for Forming TDM Signal Bursts for a Time Division, Multiple Access Satellite Communications System, which is a technique whereby active information channels are sampled at each station so that an information burst is formed directly by the sampler, thereby eliminating the need for a time-compressing memory to form the burst. Burst length may be increased or shortened in accordance with the number of active channels.

- **William G. Schmidt** (COMSAT Labs): Frame Synchronizer for a Biorthogonal Decoder, which is an apparatus for simultaneously comparing a received frame synchronization word with each possible phase of the synchronization word generated at the receiver. The basic frame synchronization technique involves orthogonal coding and correlation detection decoding, thereby exhibiting exceptional speed and reliability in poor signal-to-noise ratio environments.

- **William G. Schmidt**: Channel Reallocation System and Method, which is a method for periodically reallocating channels among earth stations in a time division multiple access system. The burst time of

each station is shifted in accordance with a set of rules which prevents overlapping, during reallocation, between bursts from adjacent stations.

- **Wilfrid G. Maillet** (COMSAT Labs): Variable Burst Length TDMA System, which is a method for periodically reallocating channels among earth stations in a time division, multiple access system. It differs, in part, from Mr. Schmidt's channel reallocation patent in that the burst time of each station is shifted in accordance with a different set of rules to prevent burst overlapping during reallocation.

- **Lewis V. Smith** (Communications System Management, Headquarters): Radome Gutter, which is a specific design for a gutter carried on the exterior surface of a radome for a "low-look" antenna. The gutter interrupts and diverts the flow of rain water around the antenna aperture and prevents the formation of large rivulets between seams of the radome in order to eliminate or reduce signal degradation caused by such water.

- **William G. Schmidt:** Synchronization of TDMA Space Division Satellite System, which is a method for synchronizing the timing of transmissions of two groups of earth stations in a time division, multiple access system employing spot beam antennas. In this system, each group of earth stations transmits information to the other group, but cannot monitor its own communications. Consequently, a designated earth station in each group transmits synchronizing information to the other group for use by the latter.

- **James Su** (Computer Division): Nonlinear Phase-Lock Loop, which is a phase lock loop having a nonlinear circuit that provides for an accelerated lockup time for small phase difference between the locally generated reference phase and the received carrier.

- **Chester J. Wolejsza** (COMSAT Labs): Quadriphase Modulated Signal, which is a signal having constant frequency and, at any instant of time, one of four possible phases. The invention, which employs a phase lock loop and a remodulation technique, eliminates phase ambiguity caused when the loop locks onto the wrong phase.



General Sampson receives China award

Patricia Kiernan and her boss, George P. Sampson, COMSAT Vice President, Communications System Management, display a certificate of appreciation from the White House Communications Agency in recognition of General Sampson's assistance in establishing the telecommunication facilities used by President Nixon during his trip to China.

PHOTO BY ALLAN GOLFUND



Foreign visitors learn of global system

Don Ross (left), Operations Center, discusses earth station sites in South America with Mr. Yong Nyuk Lin, Minister of Communications from Singapore, and His Excellency, Professor E. S. Monteiro (right), Ambassador of Singapore to the United States, during their recent tour of COMSAT.

QE2 tests completed with success

BY JOACHIM KAISER

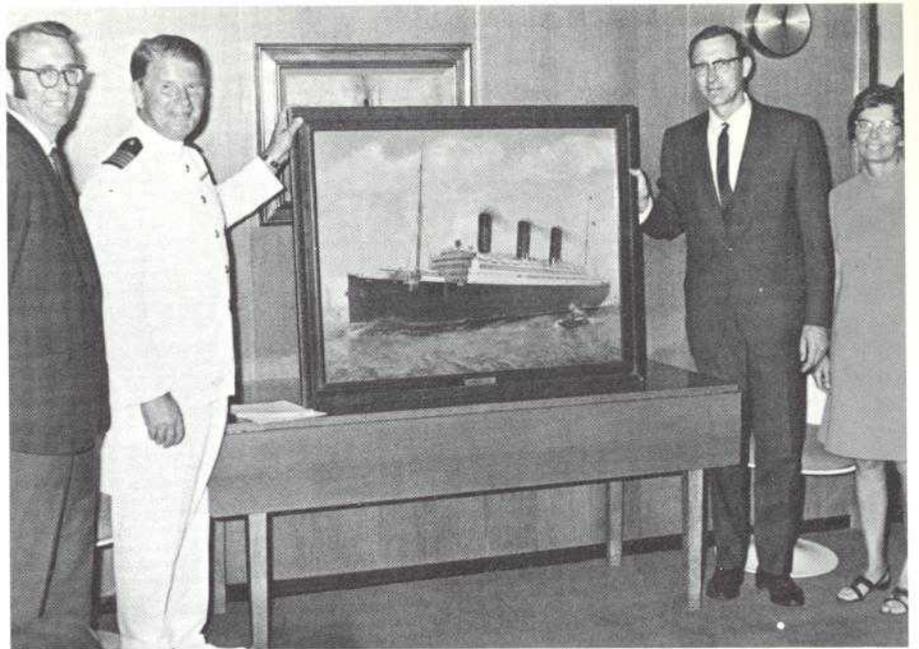
"Queen Elizabeth 2 funkt via INTELSAT IV." So read the headlines in a German technical magazine. The purpose of the experiment was to demonstrate that a good quality telephone channel could be established from a commercial ship at sea via satellite to a shore station. A successful demonstration would focus the attention of the maritime community on the feasibility of ship-to-shore communications via satellite.

The experiment was a complete success. We put the equipment on board the QE 2 on March 10, established the first contact with the Labs via INTELSAT IV, F-3 on March 15, and continued demonstrations of telephone, teletype and facsimile transmissions until May 15.

During the two months, the QE 2 made four cruises in the Caribbean, visiting St. Thomas, Barbados, La Guaira, Venezuela, and Curacao; one Atlantic crossing; a Mediterranean cruise, and then returned to New York. Anyone who might think our task was an enjoyable vacation should consider that we were on board during three storms (including one of the worst on the Atlantic in 40 years), moved from cabin to cabin for each trip, worked odd and long hours, met the public to explain the experiment, repaired and maintained somewhat cantankerous mechanical and electronic equipment, and perhaps worst of all were virtually incarcerated on that stately ship for two months.

The placement of the equipment on board the QE 2 on March 10 was nothing short of spectacular. Our helicopter crew did a magnificent job, completing four lifts in about 20 minutes. John McClanahan, Bill Kerns, and I got our thrills by being the only crew underneath the S58 heli-

■ Mr. Kaiser is senior staff scientist in the Technology Division, COMSAT Labs, and project manager for the shipboard terminal project.



Captain Mortimer Hehir of the QE 2 (second from the left) accepts a painting of an early Cunard liner from Kim Kaiser (second from the right) as John McClanahan and Mrs. Kaiser look on.

copter to engage and unhook the loads.

The Cunard ship's crew, under the direction of Chief Officer Douglas Ridley, had prepared the sites for the antenna and the electronics equipment quite well. In appreciation of their efforts we presented them a picture of the Cunard *Berengaria*, located by

The first test of the antenna hold-down system came as we left New York in a blinding snow storm.

Procurement's Ed Wabnitz in an antique shop in New Market, Maryland. This picture, painted in 1924, complete with a descriptive plaque, now hangs near the main entrance to the ship.

The first test of the antenna hold-down system came as we left New York on March 11 in a blinding snow storm. Only after the antenna withstood winds of 100 mph during the Easter cruise did we feel confident of its ability to resist the predicted furies of springtime Atlantic crossings. I was heard to say, "Surely the Atlantic can serve up no weather more severe

than we are having now." How wrong I was!

When we first got the system working on March 15, we called Commodore W. E. Warwick of Cunard, who was most instrumental in sponsoring the experiment, at 4:15 a.m. in Southampton, England. The phone call traveled via INTELSAT IV, F-3 to Clarksburg Labs' DICOM station and then on a second hop via INTELSAT IV, F-2 to Goonhilly Downs, England. Warwick answered his phone with a "jolly good", and later explained that not many of the technical experiments on board the QE 2 had actually worked, thus there was great elation in having this one go so well.

In Curacao, we welcomed aboard Col. J. D. Parker, who had originally suggested the experiment. We also entertained Bryn James, project manager of the Barbados Earth Station, H. Eikelenboom and A. Andriessen, of Curacao Netherland Radio, and also invited the Prime Minister of Barbados to view the station.

As part of the tests, we contacted the IBM 360 computer at the Labs in Clarksburg in order to exercise the antenna pointing program, which predicted pointing angles for some 50 hours based on the ship's course, speed, and starting position. Bendix

Navigation Division came through with flying colors and replacement gyros when trouble developed with

... John McClanahan went home to look after his new daughter, born while he was on board. He had received the good news from his wife via satellite.

both the vertical and directional gyros in the antenna stabilization system.

Al Dohne, Drew Walker, and Gene Cacciamani then all took their turns on the ship when John McClanahan went home to look after his new daughter, born while he was on board. He, of course, received the good news from his wife via satellite.

The shore station at the Labs was expertly manned for long hours by Bob Hefele, and at times by Helen Caviston who found this duty a welcome change from circuit board wiring.

On April 15 we set out on the first leg of the Mediterranean cruise, a crossing of the "Western Ocean" as that body of water is lovingly referred to by our British friends. The weather advisories regularly transmitted to us via Xerox Telecopier by Bendix Commercial Service Corp. in New Jersey did not show the storm that developed just a day out of New York. The QE 2 was caught in one of the worst storms in the Atlantic in 40 years. The noon-day bulletin on April 18 read like this: "V/1 hove to in mountainous seas, N'y swell. Winds North force 12. O'cast, continuous rain, V/1 pitching and shipping spray o'r all."

We remained that way for 22 hours, and finally arrived two days late in Southampton. The COMSAT equipment, as well as the COMSAT



Kim Kaiser prepares for a test.

engineers, came through that ordeal, however, without a hitch.

We did not operate the antenna in the strongest winds, which were over 100 mph, but began soon after the storm abated while the ship was still in heavy seas. The system worked with $\pm 3^\circ$ pitch (a lot for a ship 1000 feet long) and even up to a $\pm 10^\circ$ roll.

The channel worked fine with about 4.5 to 7.5 dB C/N most of the time. (We had virtually no margin.) We observed a 3 dB signal fade during a very heavy rainstorm, and a loss of $\frac{1}{2}$ dB whenever the salt accumulated on the mica antenna feed window. There was some blocking when the antenna pointed at the smokestack or mast (laden with radars) and some interference from the ship's 12 MHz 1500 watt HF transmitter. We repaired power supplies, recorders, and our up-converter, replaced gyros, trimmed recalcitrant servos, and repaired the antenna elevation axis shear pin with the help of the ship's chief engineer.

Our experiment was listed in the ship's daily paper and I even acted as master of ceremonies at a live communication demonstration held in the ship's 500-seat theater, which was packed for the performance!

The ship's lovely physiotherapist had volunteered to have her electrocardiogram taken by the ship's nurse,

The experiment also received much acclaim in the regular press and was judged a success by all of those who used the facilities.

using the Bioserv unit furnished by Communications Services Corporation. Her EKG was transmitted to their offices in Rockville, Maryland, analyzed by the COMSAT computer and returned to the ship via a Xerox 400 telecopier. To our chagrin, the computer said that Eve had a bad heart! Apparently we had not passed our tests as "medical" technicians.

The experiment also received much acclaim in the regular press and was judged a success by all of those who used the facilities. Among these were visitors to the COMSAT exhibit at the ICA Conference in Dallas which was connected directly to the Labs station via land line and the QE 2 via satellite.

The experiment on board the QE 2 taught us a great deal about satellite communications from a ship with all of the attendant problems. The demonstration proved once again that COMSAT is at the forefront of new technology and applications for satellite communications.

Norwegian firm awarded contract

COMSAT on behalf of INTEL-SAT recently awarded a contract to Electronics Research Laboratory of Trondheim, Norway, for an acoustic wave filter study. The \$45,000 contract is to be completed within 12 months.

The contractor will examine acoustic surface wave techniques as part of the design of lightweight multiplexers for future multichannel communication satellite applications.



A young Alaskan communicates "via satellite" for the first time.

Satellite tests concluded at Alaska sites

By DAVID W. LIPKE

COMSAT's 16-foot transportable earth terminal has successfully completed a two-month tour of six Alaskan communities. At Juneau, Kodiak, Nome, Barrow, Bethel and Ft. Yukon, Alaska residents for the first time witnessed the services that satellites are capable of providing to small communities in remote areas.

The demonstration and test program, arranged jointly with the office of the Governor of Alaska, was well-received. Video signals were sent from studio KTVA-TV in Anchorage to the Bartlett Earth Station via microwave relay. These were then transmitted from Bartlett to each of the six locations for distribution to local residents using existing CATV

■ *Mr. Lipke is manager, fixed services, in the COMSAT Labs Special Projects Division.*



COMSAT's 16-foot earth terminal on site in downtown Nome.

or broadcast facilities.

Included in the demonstration was a one-hour television program that was transmitted on three consecutive days to each site. The program also featured live newscasts so that these communities could witness programming at the same time it was being shown in Anchorage, a first for Alaskan broadcasting.

In addition to the television, residents were given the opportunity to place telephone calls via satellite to various points within Alaska and to other states as well. Notable use of this two-way voice capability provided by the small earth terminal was made by Governor William A. Egan, as he spoke to various officials in Washington, D. C., including FCC Chairman Dean Burch and COMSAT President Dr. Joseph V. Charyk. The governor also exchanged greetings with Governor John A. Burns of Hawaii.

For all of these transmissions, the satellite link provided high-quality service, comparable to those now provided on international satellite links.

For this demonstration, a spot beam from the Pacific INTELSAT IV satellite was redirected to focus on Alaska. This was the first time

that one of the INTELSAT IV antennas, controlled by ground command, was used for such widespread public use.

The 16-foot transportable earth station will remain at Ft. Yukon for approximately two months to collect scientific data concerning the propagation of satellite signals through the ionosphere in high latitude regions. This phase of the program represents a joint effort between COMSAT and the University of Alaska and will provide data important to the design of future satellite systems serving remote regions.

INTELSAT engineers attend seminar

The COMSAT Labs, under INTELSAT sponsorship, have trained a group of foreign engineers in preparation for a series of echo canceller field trials scheduled for this fall.

The engineers from Brazil, England, France, Germany and Japan attended the two-week seminar arranged by Dr. S. J. Campanella, manager of the Labs' baseband processing branch and staff members Henri G. Suyderhoud and Michael Onufry.



Hostess Cindy Watson of Personnel presents COMSAT Vice President George P. Sampson with a data certificate that was sent "via satellite" at 9600 bits per second.

Data transmission via satellite shown at AFCEA

COMSAT publicly demonstrated the transmission of high speed data over a normal voice grade satellite circuit for the first time at the Armed Forces Communications and Electronics Association Convention held recently at the Sheraton Park Hotel, Washington, D. C.

The demonstration provided for the transmission of data at 9600 bits per second over a combination of terrestrial and satellite circuitry.

Data terminals on each side of the booth of the COMSAT exhibit were connected through modems via landlines to the Etam, West Virginia, Earth Station. There, links to and from an Atlantic INTELSAT IV satellite established the satellite connection. The two satellite links were separated in frequency, the up-link having a 6 GHz carrier and the down-link having a 4 GHz carrier.

The modems used in the demonstration operated at 9600 bits per second and were furnished by the CODEX Corporation. Test equipment provided by International Data Sciences, Inc., consisted of error rate analyzers and a programmable digital printer. This equipment tests circuit quality, provides a digital visual display of bit errors, and allows a prediction of through-put. Associated with the analyzers was a programmable digital printer which provided a documented record including an event identifier, data error sample, and the time of occurrence.

The terminal equipment that demonstrated the actual transmission of data over the satellite circuit was provided by the Mohawk Data Sciences Corporation.

Labs reorganized into five major divisions

A new organizational structure for COMSAT Laboratories was recently announced by Wilbur L. Pritchard, Vice President and Director of the Labs. There will now be five divisions as follows:

The Systems Engineering Division, under Reinhard Stamminger, which will include general systems engineering, advanced studies, simulation, earth station interface work, analysis, and engineering economics.

The Technology Division, under John Puente, which will include the Communications Processing Laboratory, formerly under him, the RF Transmission Laboratory, and most of the Spacecraft Laboratory.

The Applied Sciences Division, under Dr. Edmund Rittner, which will include solid state devices, materials,



Mr. Seidel

Seidel elected ICSC vice-chairman

Bernhard Seidel of the Federal Republic of Germany has been elected Vice-Chairman of the Interim Communications Satellite Committee (ICSC), the governing body of INTELSAT. The Committee consists of 18 members, representing 48 of the 83 member countries of INTELSAT.

Mr. Seidel has been the representative of the Federal Republic of Germany to the ICSC since 1966. He is Ministerialrat of the Bundesministerium für das Post-und Fernmeldewesen in Bonn and holds a graduate engineer degree from the Technical University of Berlin.

As previously announced, Mr. Ernst Eliassen of Canada was elected Chairman of the ICSC at the preceding Committee meeting. Messrs. Eliassen and Seidel will begin their terms in July.

components, orbital environment, physics, and some elements previously in the Spacecraft Laboratory.

The Special Projects Division, under Emeric Podraczky, which will include ATSF Project Engineering, the Experimental Satellite project, and other specific projects to be assigned from time to time.

The Laboratory Services Division, under William Fallon, which will include engineering services, laboratory maintenance, office library and publication services, and computer operations.



COMSAT members of Red Cross Gallon Club shown with COMSAT nurse Hazel Durant are (left to right) Nelson Slye, Jim Malarkey, Larry Kopp, A. J. Stotler, Kathleen Wilson, John Welch, Francois Giorgio, and Charles Baer. Missing members include Lou Early and Rock Mattos.



Thomas Harrington (left), Director of Personnel, and COMSAT President Dr. Joseph V. Charyk help Hazel Durant cut the cake in honor of Gallon Club members.

PHOTOS BY J. T. MCKENNA



COMSAT's Blood Donor Honor Roll.

1972 blood drive goes over quota

COMSAT employees have done it again. For the third consecutive year more than 100 staff members have donated enough of their blood to better the quota established by the Washington, D. C. Red Cross Blood Bank, thus maintaining family membership in this worthwhile program.

Hazel Durant of the Headquarters medical unit recently celebrated the successful conclusion of this year's drive by having a coffee for members of the "Gallon Club."

Two long-time club members, Charles Baer and Rock Mattos, were especially cited for having given more than seven gallons each over the years.



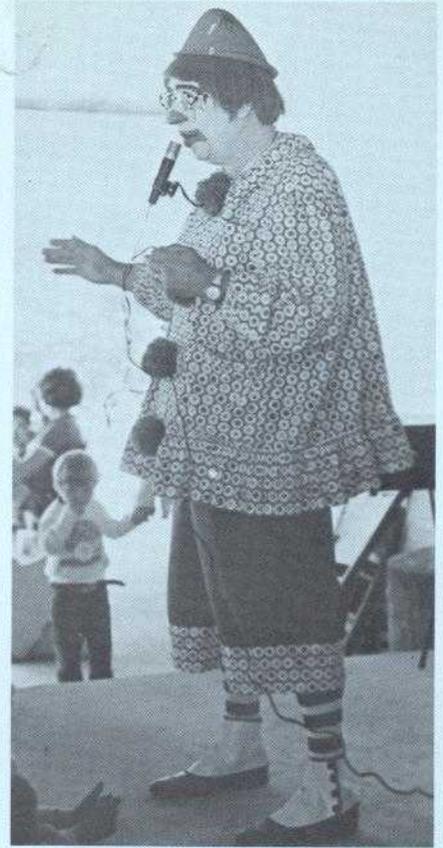
A two-fisted eater.

A perfect day for a picnic

Nearly 600 adults plus about 400 children attended the Annual CEA Picnic at Smoky Glen Farm, Gaithersburg, Maryland, on June 11. The warm day with a cool breeze was perfect for being out-of-doors with friends and family.

The children, attending with COM-SAT employees and friends, spent snatched moments eating the hot dogs, hamburgers, chicken, potato chips, cupcakes, ice cream and drinking up cases of pop. The rest of their time was spent watching Chuckles the Clown, the model airplane show, riding the ponies, or playing games at the booths. A number even helped the adults at soccer.

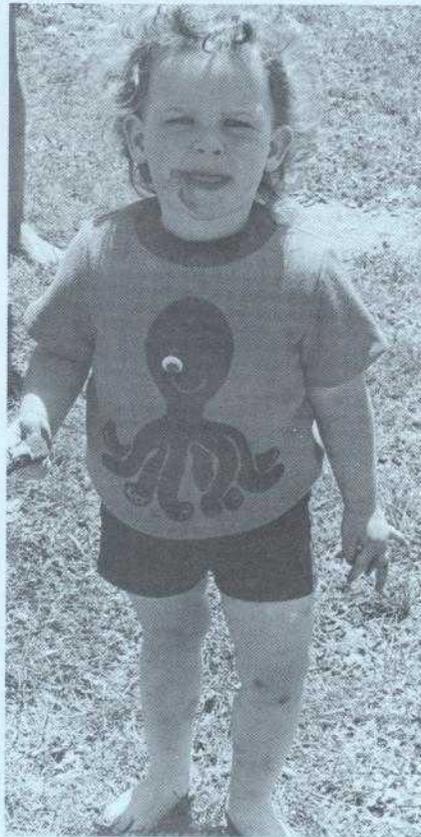
Some adults were kept busy at the beer wagon, the food tables, and visiting. Others also participated in the soccer, volleyball and softball games. By the end of the day, when the food supply was depleted, people went home with full stomachs and sore muscles.



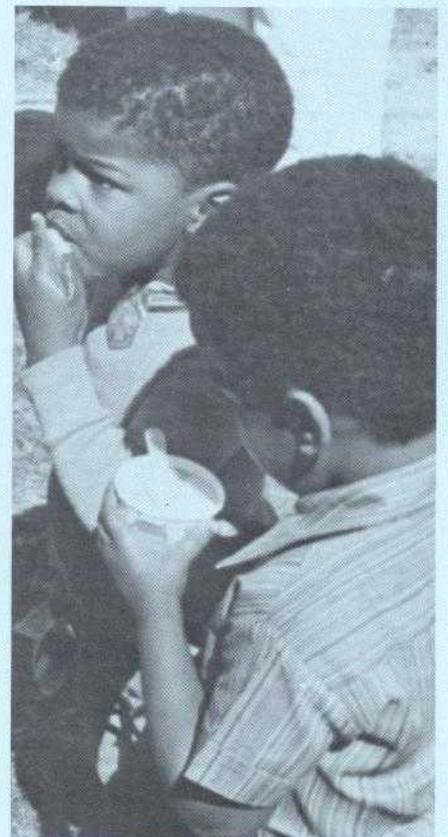
Every picnic needs a clown.



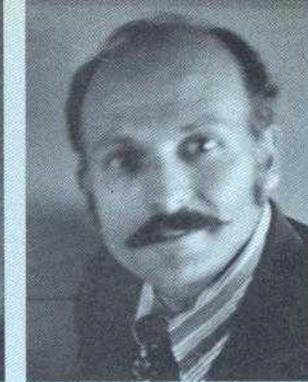
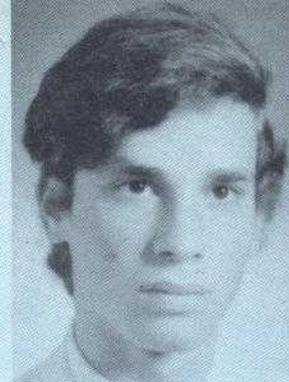
Dixie Joye and her sons, Clifton and Jeffery (right), relax in the sun.



Dave Coombs' daughter, Valerie, munches on an ice cream bar.



Audrey Rudd's son, Keith (right), and friend Dwayne Taylor enjoy a treat.



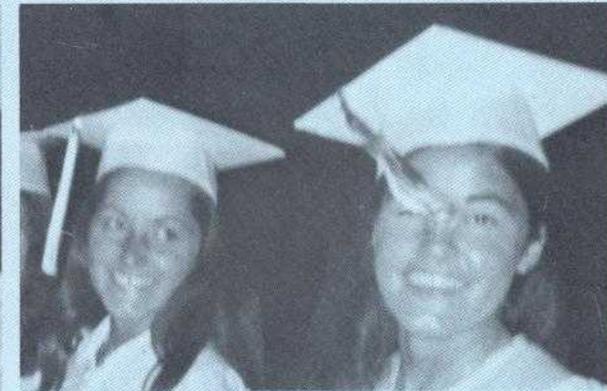
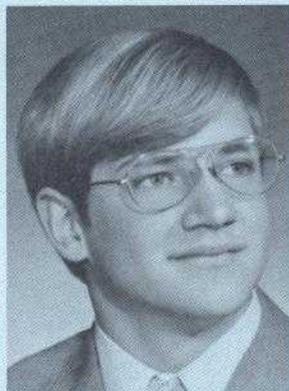
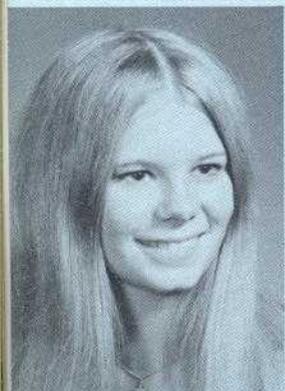
Barbara Ewing, daughter of Mr. and Mrs. Alvin Ewing (Labs), Roland Park Country School, Baltimore, Maryland.

Susi Lardy, daughter of Mr. and Mrs. Neil Lardy (COMSAT West), Rolling Hills High School, Rolling Hills, California.

Pancho Bracht, son of Mrs. Barbara Bracht (Headquarters), and the late Alberto L. Bracht, Langley High School, McLean, Virginia.

Debra Lee Campbell, daughter of Mr. and Mrs. Don Campbell (COMSAT West), South High School, Torrance, California.

Steven Morrison (Labs), Juris Doctorate, George Washington University, Washington, D. C.



Mary S. Velasco, daughter of Mr. and Mrs. Gilbert A. Velasco (Labs), Glen Burnie Senior High School, Glen Burnie, Maryland.

Jeffrey E. Lauterbach, son of Mr. and Mrs. W. M. Lauterbach (Brewster), Brewster High School, Brewster, Washington.

Michèle Brooks, daughter of Mr. and Mrs. Charles K. Brooks (Headquarters), Penn Hall Junior College, Chambersburg, Pennsylvania.

Carole and Corinne Brooks, twin daughters of Mr. and Mrs. Charles K. Brooks (Headquarters), Woodward High School, Montgomery County, Maryland.

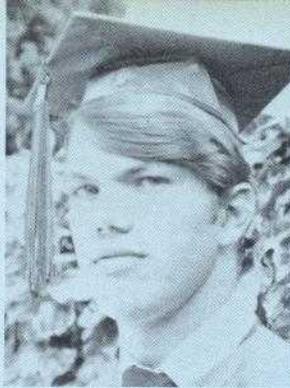
THE 1972 GRADUATES

The 22 graduates of June 1972, pictured on these pages, include not only the sons and daughters of COMSAT employees, but also some employees who received degrees. The following graduates' photos were not available: Michael R. Gordon, son of Mr. and Mrs. Matthew Gordon, (Headquarters), Bachelor of Arts (philosophy), Colgate University, Hamilton, New York; David Dean, son of Mr. and Mrs. Richard Dean,

(Etam), Rowlesburg High School, Rowlesburg, West Virginia; Emiko Makizuru, daughter of Mr. and Mrs. Robert H. Makizuru, (Paumalu), Waipahu High School, Waipahu, Hawaii; and Gerald Speck, son of Mr. and Mrs. Joseph Speck, (Jamesburg), Monterey High School, Monterey, California. George J. Tellmann, whose picture and story appear on Page 26, is also a graduate.



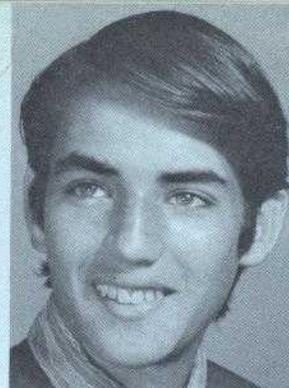
Ann Kilcoyne, daughter of Mr. and Mrs. James H. Kilcoyne, Jr. (Headquarters), Georgetown Visitation Convent, Washington, D. C.



Thomas M. Scroggs, son of Mr. and Mrs. John P. Scroggs (Jamesburg), Carmel High School, Carmel, California.



Colleen S. Attwood, daughter of Mr. and Mrs. Richard A. Attwood (Brewster), Joel E. Ferris High School, Spokane, Washington.



Edwin W. Wabnitz III, son of Mr. and Mrs. E. W. Wabnitz Jr. (Headquarters), Wheaton High School, Wheaton, Maryland.



Elaine Ewing, daughter of Mr. and Mrs. Alvin Ewing (Labs), Master of Liberal Arts, Johns Hopkins University, Baltimore, Maryland.



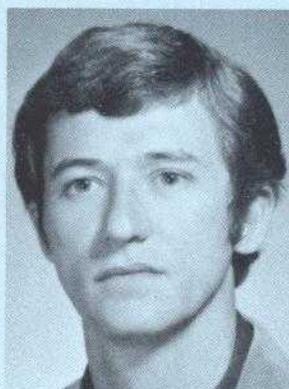
Mrs. LaVerne E. McIntosh (Headquarters), Bachelor of Arts in anthropology-sociology, Federal City College, Washington, D. C.



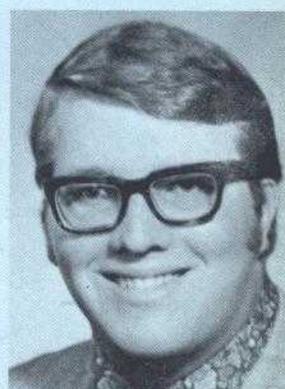
Catherine A. Smith, daughter of Mr. and Mrs. L. V. Smith, Jr. (Headquarters), Bachelor of Arts in modern languages, Montana State University, Missoula, Montana.



Constance Ann Jones, daughter of Mr. and Mrs. Earl J. Jones (Jamesburg), North Salinas High School, Salinas, California.



Thomas C. Cook, son of Mr. and Mrs. W. C. Cook (Brewster), Bachelor of Science in agronomy, Washington State University, Pullman, Washington.



Philip R. Hyde, son of Dr. and Mrs. Geoffrey Hyde (Labs), Rockville High School, Montgomery County, Maryland.



Bruce R. Elbert (Labs), Bachelor of Science in electrical engineering, University of Maryland.



Pam Ely, daughter of Mr. and Mrs. Robert Ely (COMSAT West), Redondo Union High School, Redondo Beach, California.

College degree awarded in home-study course

By SUSAN LAURITZEN

COMSAT's Educational Assistance Plan recently helped another employee, George J. Tellmann, receive a college degree. During his two years of effort Mr. Tellmann spent only 48 days at the university, but he more than made up for this with an exhausting home-study schedule.

Mr. Tellmann, manager, U.S. systems operations department, U.S. Systems Management, received a Bachelor of Arts degree in June from Syracuse University. His degree in Liberal Studies is offered in an unusual program at Syracuse's University College. Currently the two programs available are in Liberal Studies (humanities, mathematics, social science, or science) and Business Administration. The Liberal Studies curriculum has been in existence for seven years. Both programs are strenuous self-directed study programs. They are intensive, exacting, and stress creative, innovative, individual thinking.

Mr. Tellmann's curriculum was designed to broaden the background and knowledge he has gained in his years of work and prepare him for a master's program. With extensive engineering training in technical schools, he has spent 20 years in internationally focused jobs, including 15 years in overseas communications with AT&T before coming to COMSAT in August 1968. Because of this background, Syracuse allowed him two years of study credit, reducing his total study time for the bachelor's degree to two years.

■ Mrs. Lauritzen is an editorial assistant in the Information Office.



Mr. Tellmann reviews the course outline designed by Syracuse University for his home study program.

PHOTO BY J. T. MCKENNA

Each year Mr. Tellmann spent 24 days on the campus for lectures, interviews, discussions and assignments. During the rest of the year, he studied at home an average of two hours each weekday and 1½ days each weekend. Mr. Tellmann acknowledged that his whole family had to be part of his study program. Family outings and recreation were planned around his study schedule.

The final years of the Syracuse program can be quite flexible. Since Mr. Tellmann wanted to pursue his specific interest in International Relations, his Syracuse professor collaborated with American University's International Department to provide a self-study curriculum tailored to Mr. Tellmann and acceptable to American University, where he will begin his master's

studies this fall. He earned 32 credit hours in International Relations, which exceeds the credit hours required for admission to the American University program.

The COMSAT Educational Assistance Plan, which has reimbursed Mr. Tellmann for his tuition for the past two years, was started in the fall of 1965 with 15 employees participating. The plan was established to give financial assistance to eligible employees who desire to improve their job skills, increase their capability, or work toward a degree for future advancement. Participation has grown during the past seven years to several hundred employees currently taking courses to improve their skills or work toward bachelors, masters, and even doctoral degrees.

People at the Labs

BY CAROL LOUTHAN

It's nice to see the sun shining and people smiling once again. June brought the worst floods our Upper Montgomery County area had seen for many years.

COMSAT Lab's Slo-Pitch League recently held its East-West All-Star game. Coming out on top were the East All-Stars captained by Bill Burch. If you missed this game be sure to attend the championship game planned for early September.

On May 26, the COMSAT Labs' Table Tennis Club held its annual tournament. Twenty contestants engaged in the battle. Coming out on top were Blaine Shatzer and Prad Kaul. Second-place spots went to Jay Levatich and George Szarvas.

Vacations, vacations and more vacations, but just to mention a few!

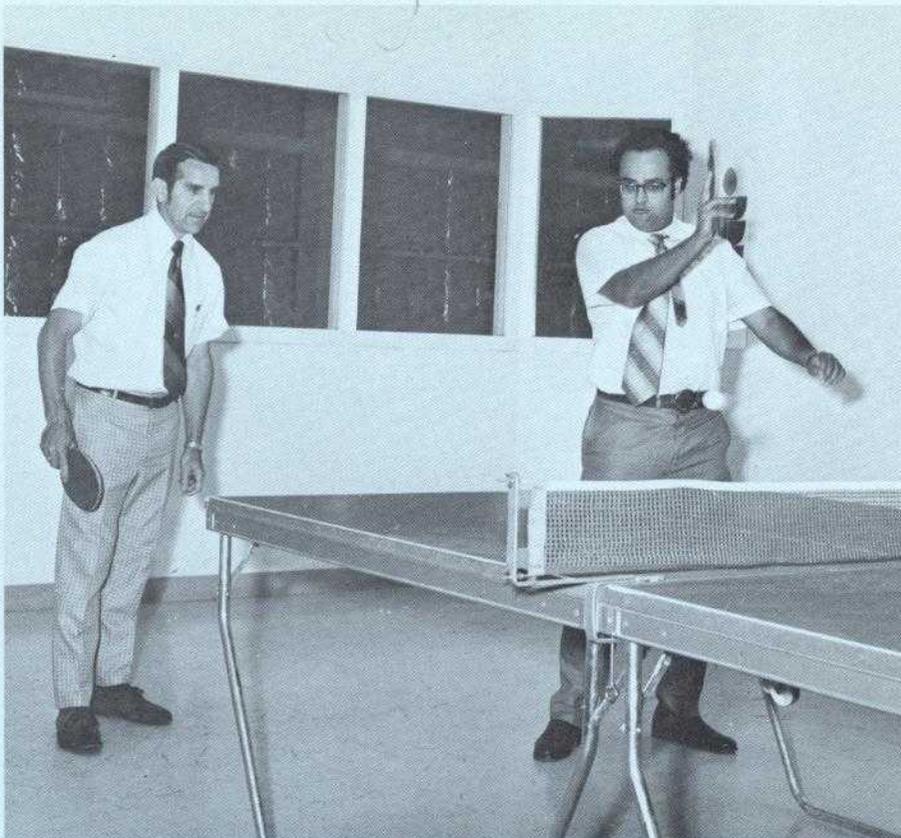
Shirley Taylor and sons Stephen and Kenny recently returned from a week's vacation in Maine. And, how better to spend a vacation than in a haunted house? The ghost, a former doctor, was reported to be very cordial.

Barbara and Hugh Hutchens spent a week baking in the Florida sun. To round out their trip, they visited Disney World where they were promptly greeted by none other than Mickey Mouse, himself.

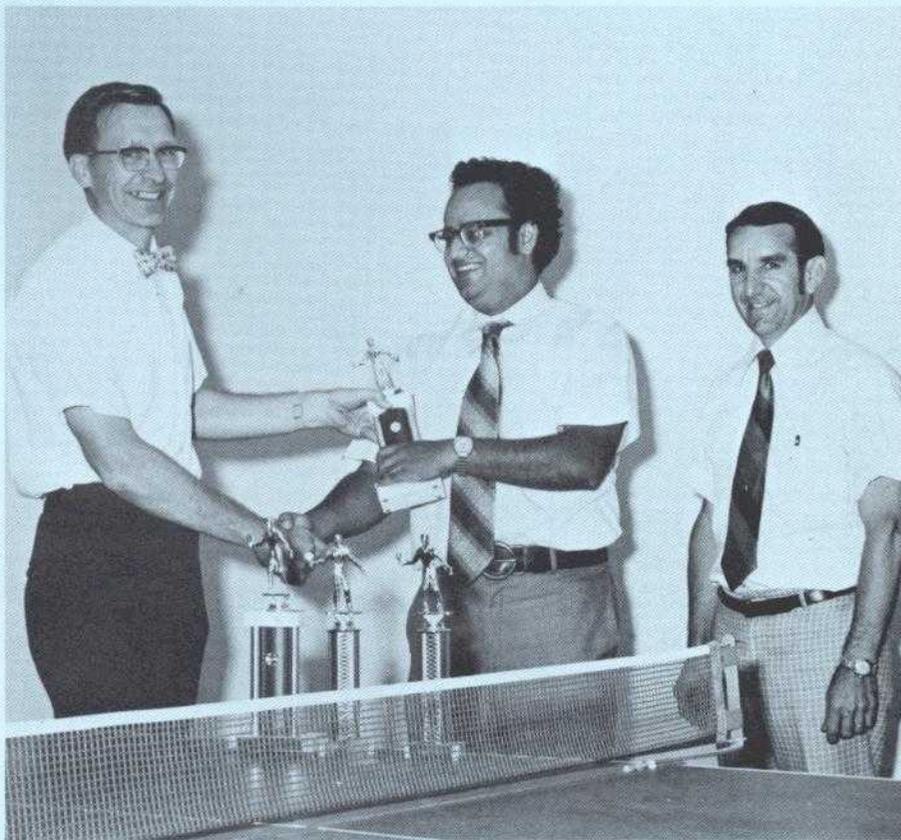
The long July 4 holiday weekend gave Neil Helm and son, Karl, an opportunity to travel to Glendive, Montana, to visit with Neil's parents. Jo Ann Wagner decided upon a cruise to Bermuda. So, on July 8, she was off for a cruise, arriving home a week later. Jan Campanaro returned to work on July 10 with a gorgeous tan from her week's stay in Ocean City, Maryland. Marlin Brown also had a delightful four days in Ocean City. She had an oceanfront townhouse, and she too came back nicely tanned.

We all want to wish a speedy recovery to Jackie Reiser, daughter of the Dave Reisers, who has been in Suburban Hospital. Also, to Marion Bennett who was hospitalized on July 9.

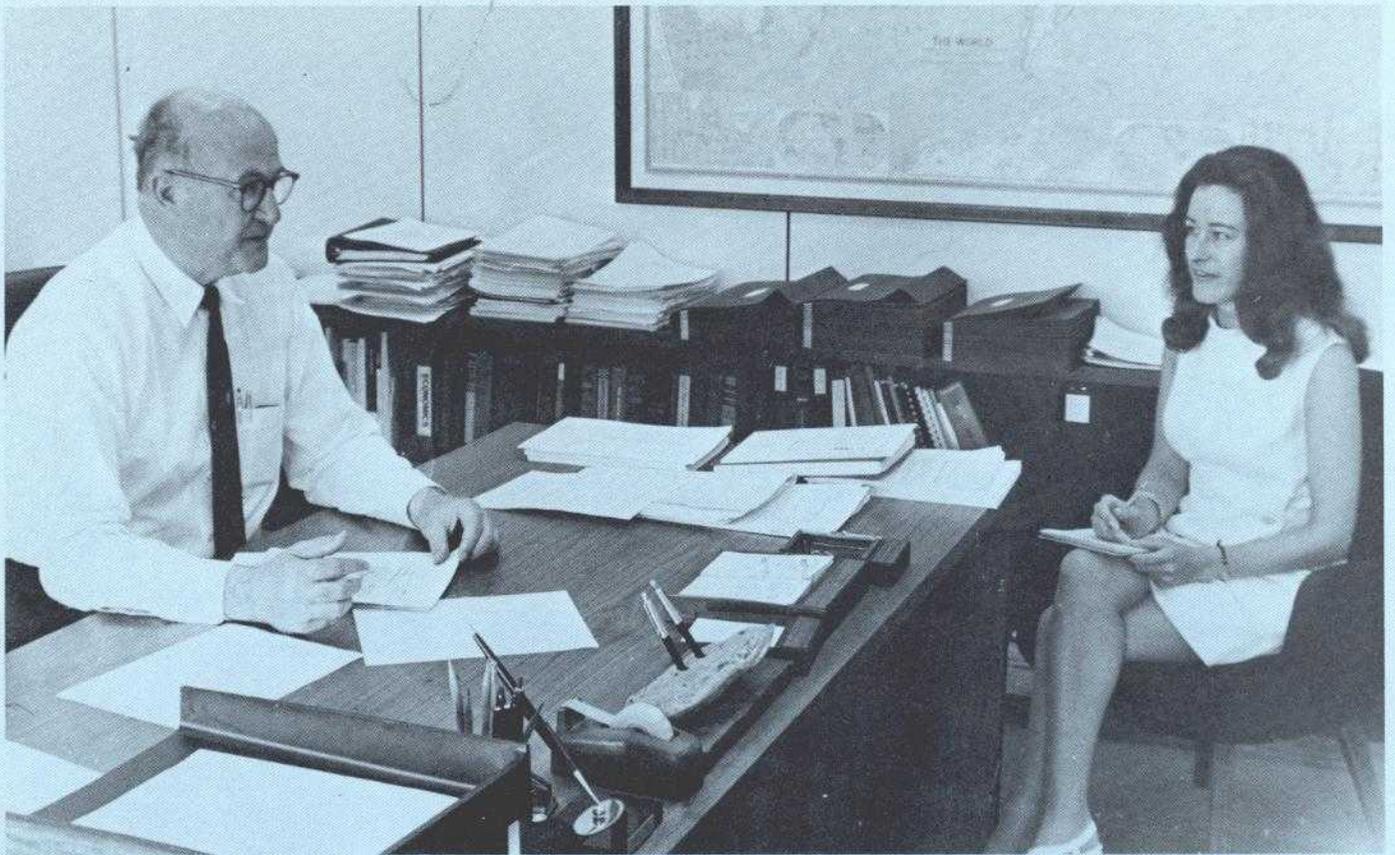
■ Mrs. Louthan is a secretary at the COMSAT Laboratories.



Teammates Kaul (right) and Shatzer in action.



Labs Table Tennis Club President Kim Kaiser (left) presents winner's trophies to Prad Kaul (center) and Blaine Shatzer.



Division Director Carl Reber prepares to dictate a memorandum to secretary Kathleen Wilson.

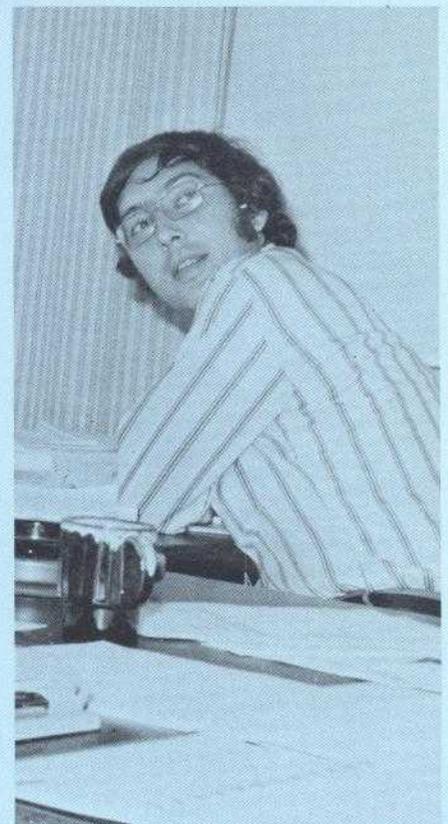


Secretary Bert Runfola at her desk.

Financial analysis

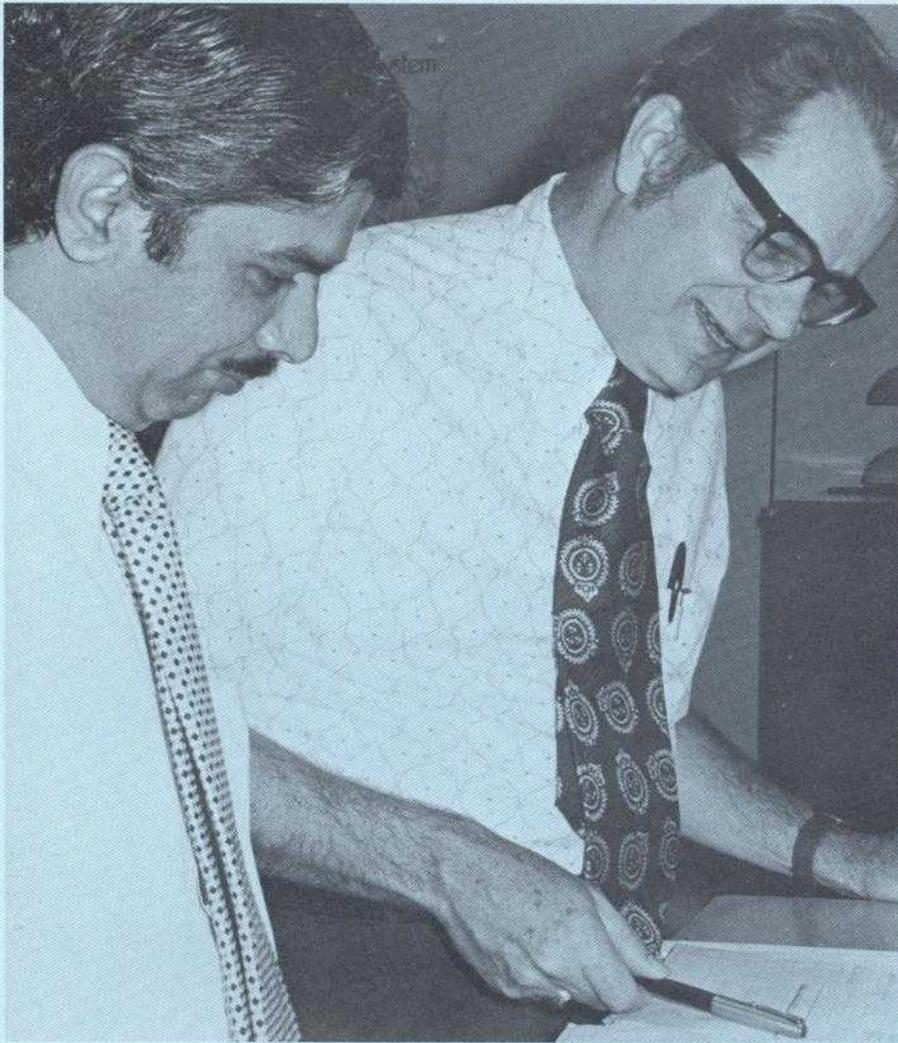
COMSAT's Financial Analysis Division is responsible for the economic and profitability analyses of new services, as well as revenue requirements in support of COMSAT rates, and the development and administration of rates and tariffs.

Under the supervision of Division Director Carl Reber, this group prepares studies which assist in supporting the continued financial viability of the Corporation.

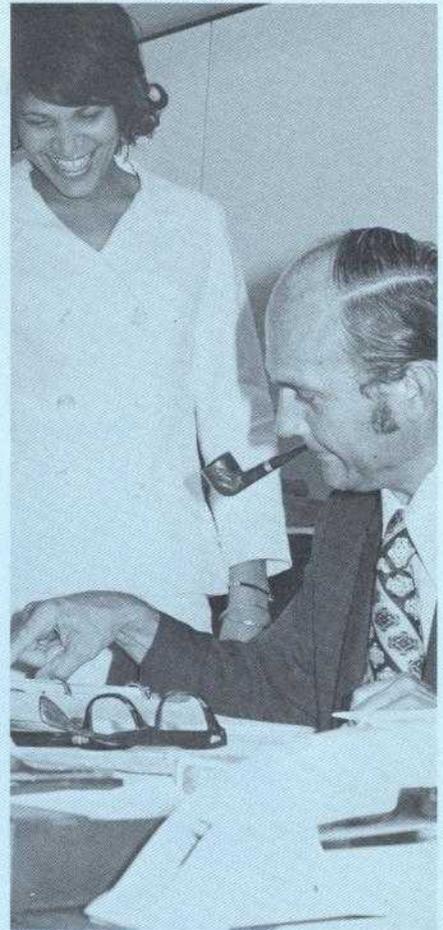


Stan Shubilla completes a cost analysis review.

PHOTOS BY J. T. MCKENNA



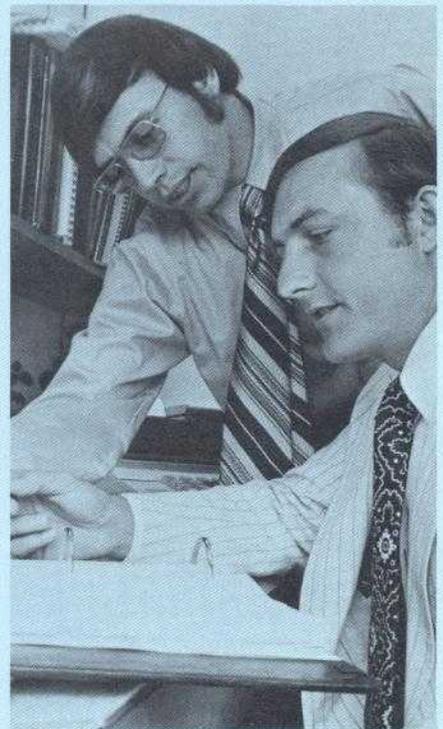
Surjit Jerath (left) and Dick Hammerly review an INTELSAT forecast.



Joe Wellington discusses a tariff revision with Alice Bullie.



Audree Coutry makes a rate comparison.



Ben Smith (left) and Vic Allen examine revenue requirements.

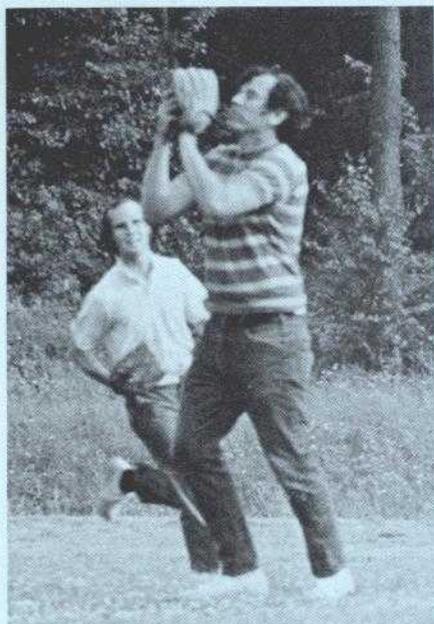


The East's John Swart beats one out as Bob Gruner waits for the ball.

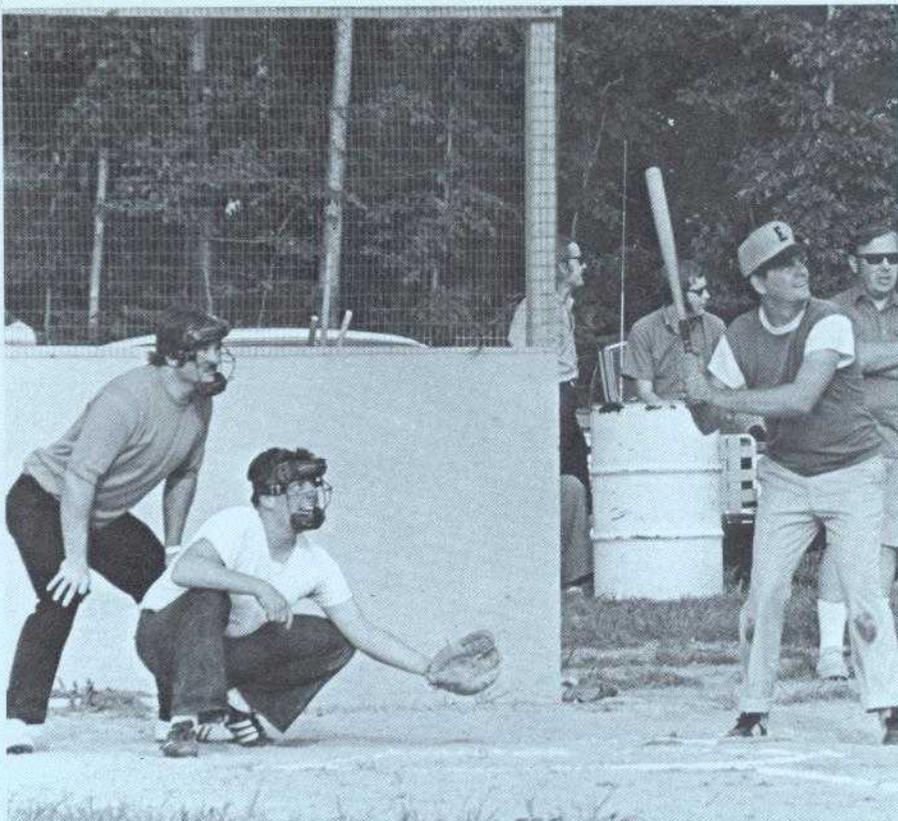
East whips West in Labs all-star game

The rain-delayed Labs Slo-pitch League All-Star game was played on June 27. A strong East team, led by Bill Burch, defeated the West All-Stars, under the direction of co-captains Hank Mueller and Blaine Shatzer, by a score of 11-6 in nine innings.

Both winners and losers enjoyed a cook-out after the contest.



Tom Patterson and Jim Owens of the West see action in the outfield.



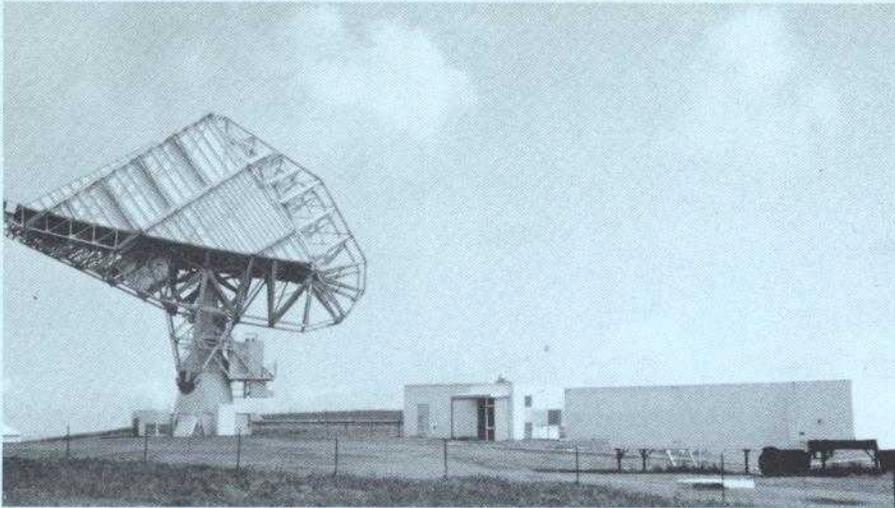
Batter Jesse Thompson of the East All-Stars prepares to swing as catcher Dave Lewis and umpire Tony Buige watch.

PHOTOS BY DAVE REISER



Eric Kauffman supervises as Marianne Merrihew (left) and Bettie Dorsey cook the hot dogs.

BY SHIRLEY A. OLIVER



The vans (right) were located next to the 42-foot antenna.

Paumalu bids aloha to station landmark

BY ROBERT N. KUMASAKA

Paumalu recently bid "aloha" to its transportable vans, which for nearly six years were a station landmark. There were no brass bands, no speeches, nor were there any tears shed as the vans passed out the main gates for the last time on Monday, June 26, 1972. Instead, it was a quiet, uneventful occasion, marked only by the roar of the tow tractor as it hauled the vans away from their accustomed place alongside the 42-foot antenna.

It seems, however, that some sort of "retirement" ceremony would have been appropriate in view of the prominent role the vans played in the development and growth of the Paumalu Earth Station. The transportable station was originally installed in 1966 to provide a TT&C facility for the initial INTELSAT II launches, and to provide back-up for the NASA Apollo Program.

After a monumental joint effort by Page, Hughes, and COMSAT personnel to prepare the transportable for service, it acted as the Pacific TT&C station during the launch of INTELSAT II, F-1 in October 1966. It

■ Mr. Kumasaka is administrator of the Paumalu Earth Station.

has played a continuing role as a TT&C station since that date.

In addition to its TT&C role the transportable was called upon for many special projects—all of which were successfully accomplished. These included the transmission of TV test signals that were looped through the antenna as it worked with the Pacific INTELSAT II satellites. It was also used for Defense Department and commercial communications requirements to the Philippines and Thailand in 1967 and 1968. During the Apollo Program, various tests were conducted with NASA's ATS-1 and live TV was received during the Apollo 8 Mission by the transportable terminal via ATS-1.

With the advent of the INTELSAT III and IV satellites, the transportable's commercial communications service requirements decreased but it continued to be used as a monitoring station in addition to its TT&C functions.

In April 1971, the equipment associated with the transportable station was relocated into the main control building. Thus, having served for more than five active and useful years, the vans were retired and declared surplus. They were put up for sale on a competitive bid basis and the successful bidder was a local supplier of contractors' equipment.

So today, there is a big void in the area where the vans once proudly stood. They had a job to perform and did it well. The Paumalu "old-timers" will agree that the station will never be quite the same with the vans gone.

The CEA was saddened by Kitty Harbin's departure from COMSAT on June 16. Kitty and her husband Danny have moved to Xenia, Ohio. We were all sorry to see her leave as she was one of the most enthusiastic CEA members. We all wish her the best of luck in the future. We are pleased to announce that Bert Runfola has been elected to fill Kitty's position as vice president and a member of the Board of Directors, and that Joyce Przelenski will serve on the Board also. Best of luck to both girls in their new position.

A CEA Wine and Cheese Party has been tentatively scheduled for September 1. This totally new function should prove to be a lot of fun.

The annual Christmas Dinner Dance will be held on December 9, 1972. This year's gala event will be at the Army Navy Country Club in nearby Virginia. Mark this date down on your social calendar so you will be sure not to miss it.

CEA members will again have a chance to see the Redskins in action in two of their pre-season games. A limited number of tickets for the Eagles game on August 18 and for the Dolphins game on August 31 recently went on sale.

■ Miss Oliver is a secretary in Communications System Management.

Benefits increased

Effective April 1, 1972, maternity benefits under COMSAT's Medical Insurance Plan were increased by \$100.00.

The new benefit is a flat one of \$500 or the actual total charges, whichever is less.

An outline of the old benefit schedule and the new one is shown below:

Benefit	From	To
Hospital	\$250	Up to \$500
Obstetrical	\$150	(Combined)
TOTAL	\$400	\$500



Rupard Hobbs talks with a distant earth station via the order wire.

The Gold and the Grey compete at Etam

BY RUPARD N. HOBBS

Friendly competition is the order of the day at Etam as two Operations teams—the Gold and the Grey—strive to provide the flawless service expected of an earth station in today's global system.

Etam's two teams certainly insure that this high technical level of competence is maintained around the clock. A look at the background of the team members tells the story.

The Gold Team leader, John Formella, came to Etam from his home state of Wisconsin after serving 20 years in the U.S. Navy as a communications specialist.

He now makes his home on a farm, that all "old retired salts" dream of, near Arthurdale, West Virginia. When questioned about his horticultural accomplishments, he remarked, "I have been here four years, and every year has been different. I wonder how many kinds of weather there really are in West Virginia!"

Team member Lynn Rector, who comes from near Pittsburgh, served in communications with the U.S. Army in Vietnam. He joined our staff as a technician three years ago and was recently promoted to the position of senior technician.

■ *Mr. Hobbs is operations supervisor at the Etam Earth Station.*



John Formella corrects a reading on the wave analyzer.

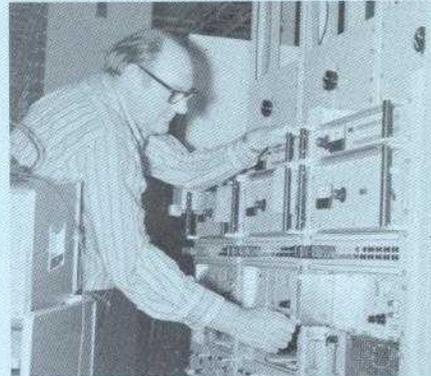
Gold Team anchorman Bill Bell, who comes from Masontown, Pennsylvania, has a wide background of electronic and mechanical experience as he worked with the Martin Company at Cape Kennedy prior to joining COMSAT. "They are going to have to get to the moon by themselves," he said in April 1968 as he returned to his old stomping grounds, the Alleghenies, and then to Etam.

Rupe Hobbs, a veteran of 20 years in the communications industry, heads up the Grey Team. He finds that he spends much of his time "hablaring" with representatives of many of the Spanish-speaking countries served by Etam. "I had to learn what they were talking about in self-defense," said Hobbs.

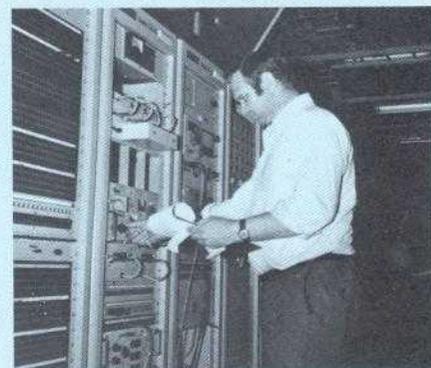
Carl Cooper and Don "the Egg Man" Gaston complete Rupe's team. Carl, a native West Virginian, joined the Army twice but just couldn't stay away from the hills of his home state. He can usually be found monitoring our multiplex voice appearance test board which serves 22 foreign countries.

Don joined us after 15 years with the phone company in Washington, D. C. He moved in right across the road from the station where he raises horses, chickens, turkeys, ducks, dogs, cats and dust. He also supplies us with those real farm-fresh country eggs with a taste that most city folks have long since forgotten.

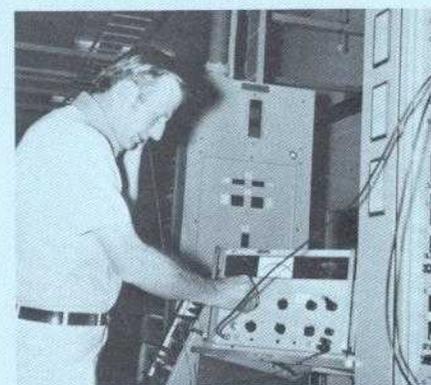
These are some of the men who make our earth station function effectively day-in and day-out.



Bill Bell configures a module for a contingency carrier.



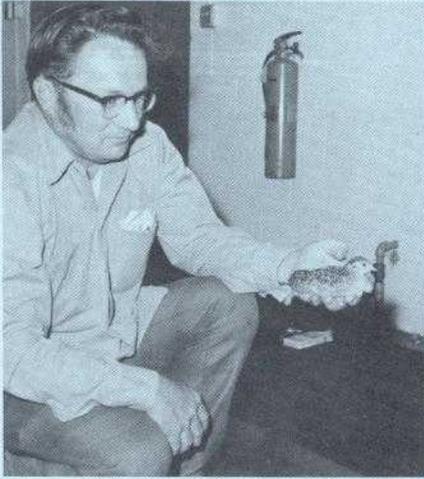
Carl Cooper measures a level at the voice appearance test board.



Don Gaston takes an out-of-band noise measurement test.



Lynn Rector makes an entry at the supervisory console.



Don Briggs with a young pheasant.

News from Brewster

BY DOROTHY BUCKINGHAM

Wayne Colpitts, president of the Brewster CEA, reports that the pheasant raising project is off to a "flying" start once again. Approximately 40 of the young birds (courtesy of the Washington State Game Department) are making themselves at home on a small part of Brewster Earth Station's "out back."

Don Briggs has used his skills as well as much of his spare time to construct a sturdy pen which will serve as home for the birds for 12 weeks, after which time they will be released to seek their own way.

The young pheasants are a great source of delight and amusement to Brewster personnel and visitors, as well as a contribution to the county's game bird population.

Okanogan County has been declared a disaster area in the wake of the worst floods since 1948. The U.S. Army Corps of Engineers estimates the Okanogan and Methow Rivers caused \$6.8 million damage to public and private property.

The Corps said, however, that flood control efforts prevented additional damages of as much as \$2.5 million in the Okanogan Valley. Much of the credit for this prevention belongs to the droves of volunteers who responded to calls for help from flood control officials, many of whom spent several long days with little sleep and

■ Mrs. Buckingham is a secretary at the Brewster Earth Station.

few meals working in waist deep water on the dikes.

Several men from Brewster Earth Station were a part of the weary flood crews who spent their evenings and weekends patrolling and bolstering these dikes to protect Okanogan valley communities.

John Banister, senior technician, was isolated for several days when a break in a dike flooded the roadway to his home at Riverside.

A farewell party was held at the home of Bill and Jean Cook for the Ray Hashbergers on May 13. Hash spent several weeks in Washington, D. C., prior to his departure on July 6 for Managua, Nicaragua, where he will join the NICATELSAT team.

Darrel Nelson returned to Brewster after the Apollo 16 recovery with lots of beautiful pictures and reports of an exciting trip. He then went off to Spokane and participated in the Inland Empire Trap Shoot. Darrel reported that the members of his gun club won most of the events and he came home with a beautiful set of silverware as his personal prize.

Our annual CEA picnic at Alta Lake was held on June 10. Approximately 130 people attended. Many pounds of steaks, hamburgers, and hot dogs were consumed along with mounds of delicious salads, baked beans, cake, and cold drinks, before the day was over.

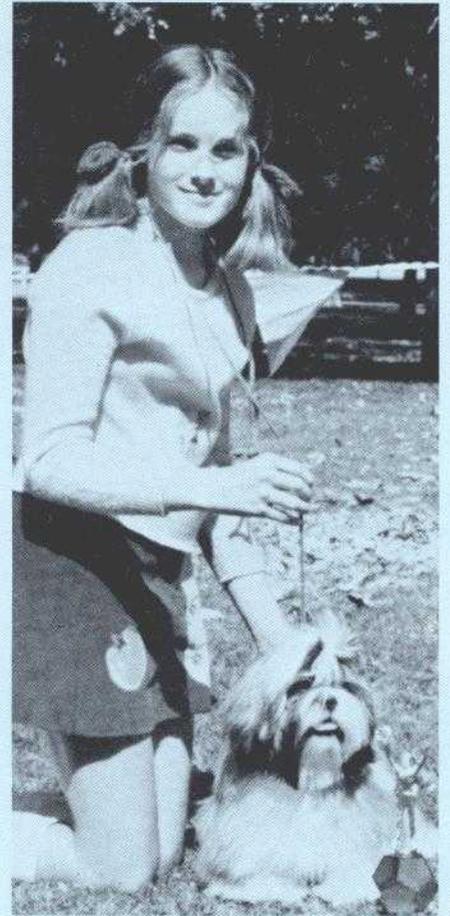
From COMSAT west

BY AL VERBIN

Sorry to report that two of our West Coast staff left COMSAT recently. Marty Vonnegut, manager of spacecraft engineering, is going into the metals fabrication business near Salinas, California.

Kurt Eriksson, one of Lou Ricks' despin control artists, has returned to Sweden to work for Saab. All of us, especially Lou, hope that he may return. The going-away party was held at Jeff Robinson's house July 15, for both Marty and Kurt.

Jeff Robinson, president of our West Coast CEA, and wife Maria, added 5 lb. 8 oz. Holly Kay to the family on May 12. Jeff survived the natural childbirth better than expected.

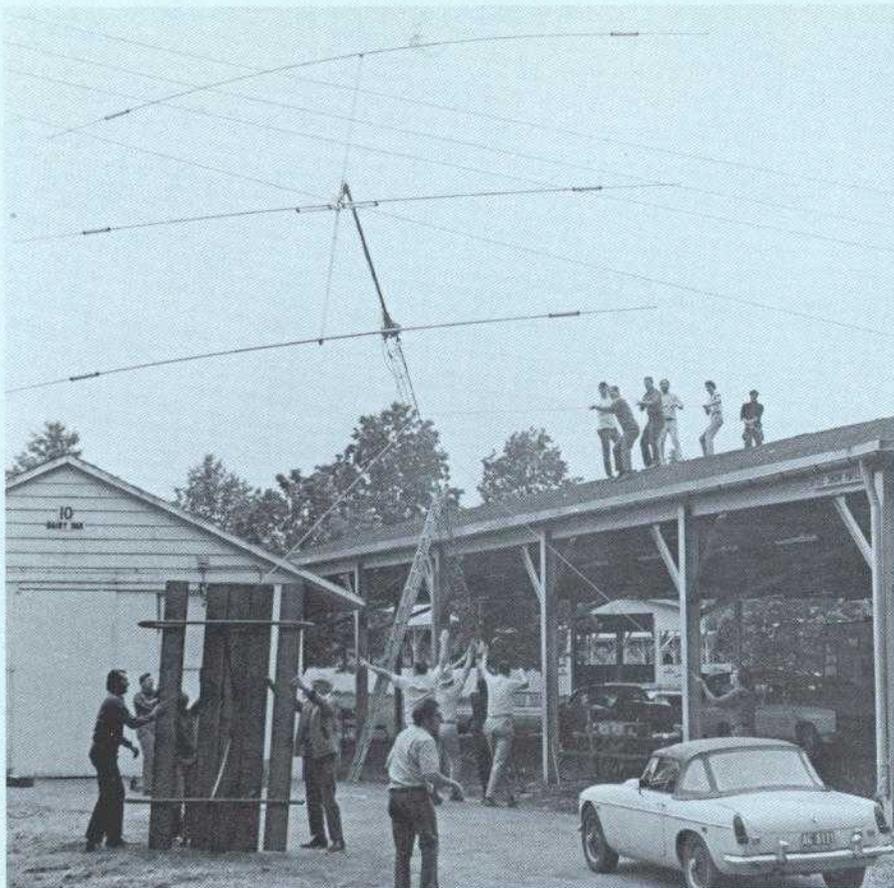


Karen Ouellette with Panda's Golden Peaches and her trophy.

At the half-way mark of our two-team golf league schedule, Osugi's Slicers (Susie and Wayne Lee, Bill Keck, Hakan Holm and Leader Osugi) hold a substantial lead over Ely's Hookers (Don Campbell, Jeff Robinson, Neil Lardy and the Bob Elys). However, the Chief Hooker vows a turnaround in the second half.

Karen Ouellette, 11 year old daughter of Joe Ouellette, went best "Junior Handler" at the Southern California Shih Tzu Fancier June Match, with her six month old Panda's Golden Peaches. Karen also won another first in the 10 to 13 year old Junior Handler Class at San Gabriel Valley Toy Club Match. At a July all breed match in Anaheim, Karen and her Shih Tzu went "Best of Breed" and took a Group Third in the puppy class.

■ Mr. Verbin is a member of the Space Segment Implementation Division in Communications System Management.



Up goes the antenna as the 1972 Field Day begins.

PHOTO BY DAVE REISER

Radio club holds annual field day

BY CAL COTNER

The COMSAT Amateur Radio Club again joined with the IBM Gaithersburg Radio Club for their 1972 Amateur Radio Field Days which were held on June 24 and 25. The outing took place at the Gaithersburg, Maryland, Fair Grounds, using the call letters WA3JZR/3.

Since this event took place on the heels of Hurricane Agnes, the emergency aspects of the disaster were fresh in everyone's mind. Care was taken to operate away from frequencies being utilized by hams in severely flooded areas for emergency communications.

Four stations were operated full time: a station on 3.5, 7 and 14 MHz using code (CW), a single side-band

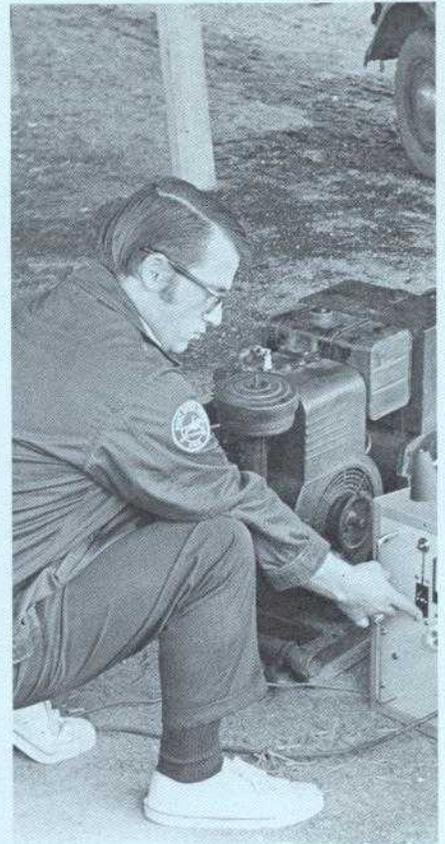
■ *Mr. Cotner is a member of the technical staff in the COMSAT Labs Technology Division.*

voice station on 3.5 and 7 MHz, another single side-band voice station on 14, 21 and 28 MHz, and a station on 50 and 144 MHz which was "time multiplexed" with a 1.8 MHz station.

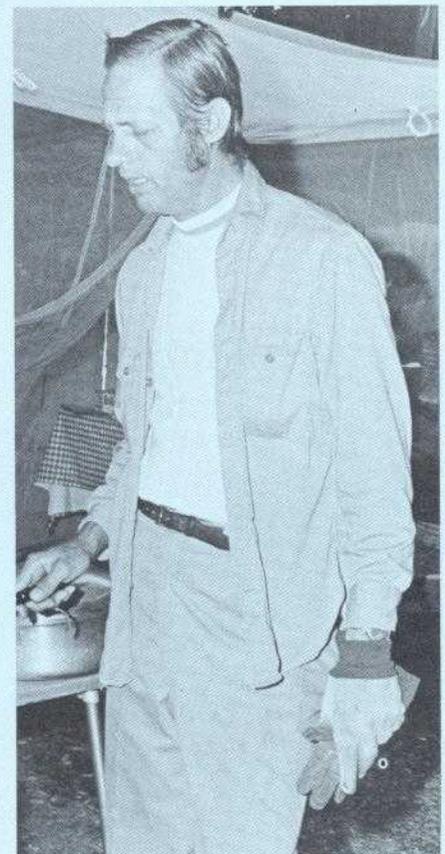
Over 1450 contacts were made during the 24-hour period with other amateurs around the world. This was a year to experiment; innovations included the 1.8 MHz station, use of open wire fed and vertical antennas, and a "no break" power transfer system for switching between generators designed by Dave Reiser. Received signal reports indicated that the antenna experiments were a success, and the 1.8 MHz station and power transfer equipment helped make every minute count.

Norm Miller of COMSAT and Frank Hadley of IBM acted as chefs for the group and prepared a total of seven meals including a charcoal grilled steak dinner on Saturday evening.

When all was disassembled at the field day's end, the general feeling was, "Let's see, now for next year we'll . . ."



Dave Reiser shifts generator loads.



Norm Miller acts as chef.



Dave White prepares to cut a log.

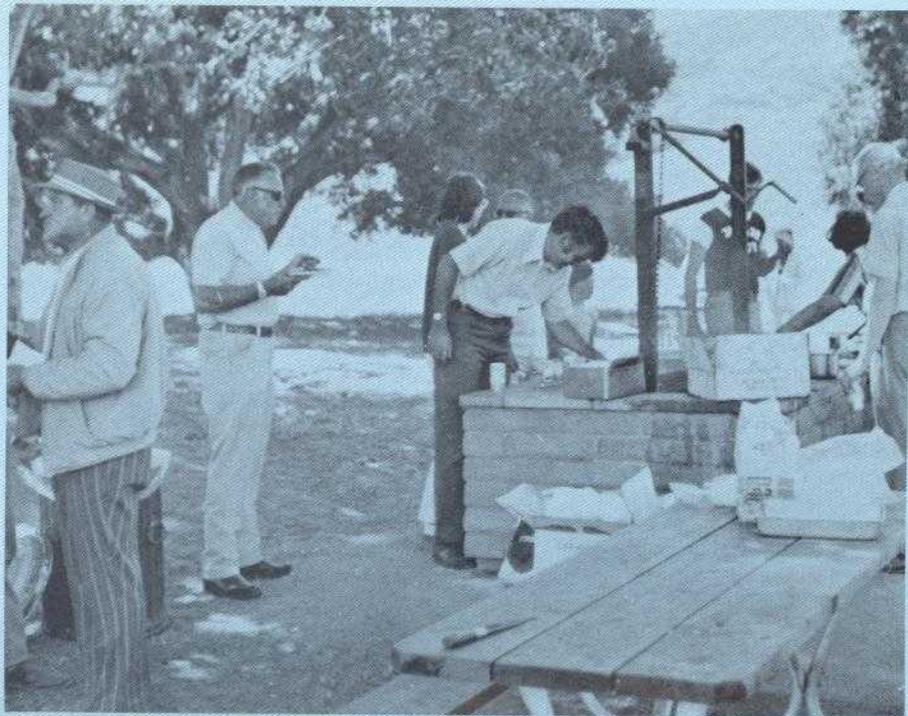
Facilities mechanic makes cedar-shakes

Dave White, a facilities mechanic at Andover, once earned his living in the Maine woods. To keep busy on those rainy days when he could not be outside, Dave built his own saw mill and started making cedar-shakes.

Today, when his busy schedule allows, Dave still spends time at his shingle mill producing cedar-shakes for distribution throughout the state.



A block of wood being cut to size.



A warm day, good food and drink are the ingredients for a successful picnic.



Mr. White stacks newly cut shingles.



The blade must always be sharp.

At Jamesburg

BY WARREN E. NEU

Saturday, June 10, was the day for the annual JCEA picnic. This year, this outstanding social event was held at Toro Regional Park, a comparatively new picnic area. It is operated and maintained in beautiful condition by Monterey County. Among other features, it provides horseback riding for those interested in this sport.

It was a beautiful day and we had a very fine turnout. Once again the oldsters became youngsters for this once-a-year activity.

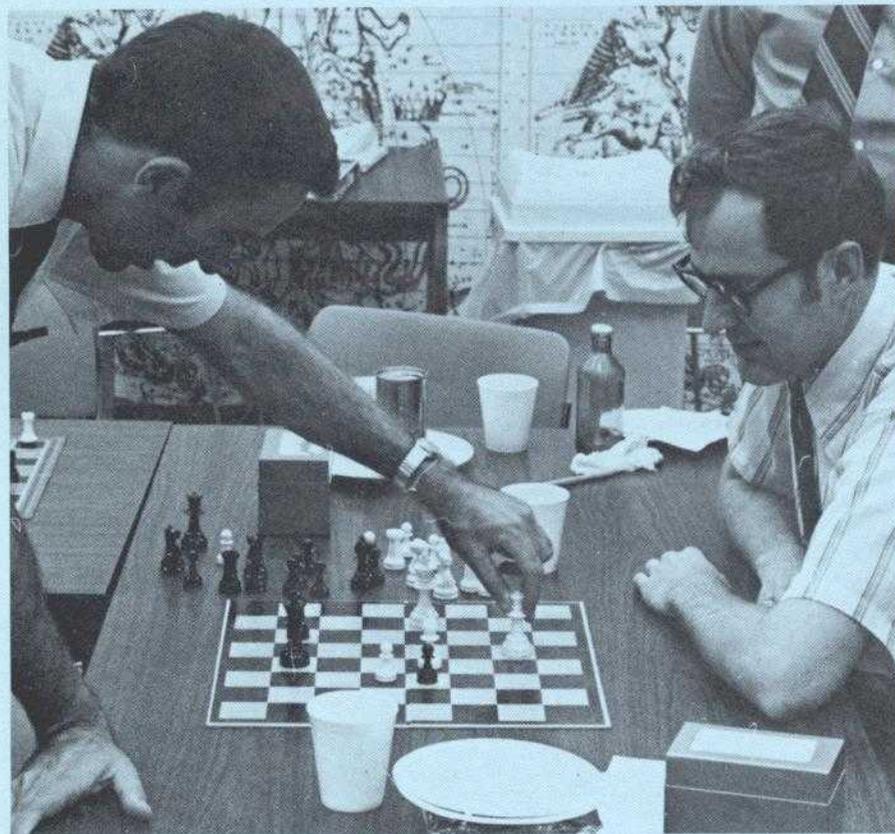
Everyone did return to work the following Monday, but with some sore muscles and even a few sprains.

Jim Harding, one of our facilities mechanics, had a recent "near-miss." While on his vacation, he drove through Rapid City, South Dakota, the day of the big flood. His original plans called for him to spend the night there but because he was ahead of schedule he continued on and thus escaped the severe flooding that swept the town. Jim is really counting his blessings.

■ Mr. Neu is administrator of the Jamesburg Earth Station.



Dan Swearingen (left) watches closely as Nick Smith prepares to make a move.



Tom Throop puts some body English into a queen move against Dennis Beaufort during the simultaneous exhibition.

PHOTOS BY JERRY BIDLACK



Chess Club President John Maddox (right) presents the victor's magnum to Peter Varadi.

CEA chess night

About 20 Plaza and Labs chess enthusiasts recently gathered in the employees lounge at Headquarters for an evening of relaxed "wood pushing." A groaning buffet and plenty of liquid refreshment were provided.

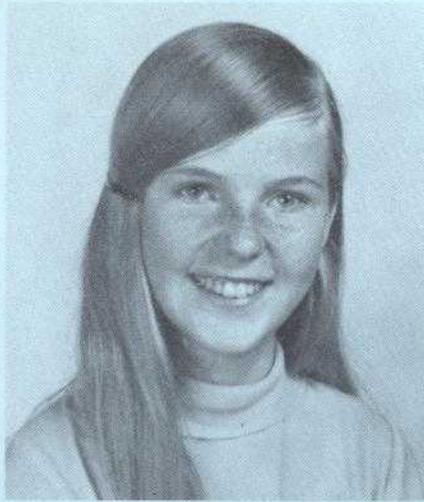
Tom Throop, COMSAT champion, faced eight players in a simultaneous exhibition and defeated all but one, Morris Atwell.

Another featured event was a four-round speed chess tournament in which all players had to make their moves within first 15, then 10, and finally five seconds. Dr. Peter F. Varadi defeated Tom Throop in a playoff and was awarded the evening's only prize, a magnum of champagne.

Bidlack wins award for science writing

Jerry Bidlack of the Information Office has won the Award of Merit for Technical Journalism in the 1972 International Publications Competition of the Society for Technical Communication.

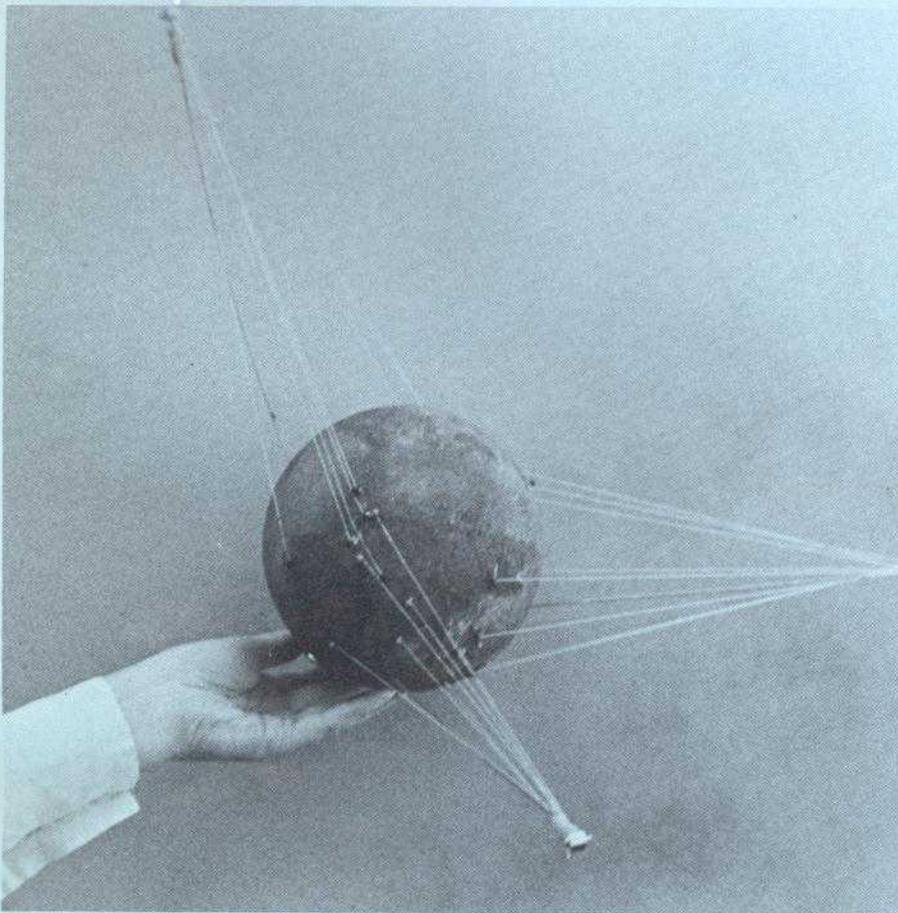
Mr. Bidlack's series of articles on the science and technology of satellite communications which appeared in *COMSAT News* between 1969 and 1971 also took first place for journalism in the 1971 Washington, D. C., area contest of the Society of Technical Writers and Publishers.



Maureen McCarthy

Satellite model wins science award

Sometimes it's hard to tell people how the global satellite system works, so 14-year old Maureen McCarthy decided to show them how.



This is the model of the global communications satellite system built by Maureen McCarthy for her school's exhibit.

PHOTO BY ALLAN GALFUND

She built a model of the global communications satellite system as her annual science project at Broome Junior High School in Rockville, Maryland.

Maureen did such a good job that she received an "A" for her presentation on COMSAT and the global satellite system, based on her model, before her eighth grade class.

Later, her model was the focal point of parental attention at the annual student exhibition of more than 150 science projects held at the school's Science Laboratory.

The exhibition included a wide variety of projects which ranged from the dissecting of frogs to complicated electronic music boxes. Last year, Maureen won first prize for the manner in which she presented a record of her food intake over a period of five months, qualifying her to enter the Montgomery County School Fair.

Maureen's dad, Eugene P. McCarthy, is Corporate Records Administrator.

5-year awards

The following personnel received five-year service awards during June and July:

Administrative Services: Paul H. Griffith, Jr., and Charles E. Kelly.

Andover: Jerome D. Bragdon, Charles O. Lepage and Stanley B. Morse.

Brewster: Harvey C. Andersen and James A. Peasley.

Cayey: Luis R. Rodriguez.

Communications System Management: Lawrence C. Adams, Paul R. Hanna, Daniel V. James, and Anton C. Pedersen.

Domestic and Aeronautical: Edward F. Lucia, Jr.

Etam: William B. Carroll and Chester A. Randolph.

Finance: Nelson F. Syle.

International: Thomas E. Donahue, Jr.

Jamesburg: Michael J. Downey and Walter D. Robinson.

Laboratories: Clarence A. Blackwell, Ronald W. Bounds, Samuel J. Campanella, James D. Dunlop, Bruce J. Merrihew, James C. Su and William W. Wu.



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