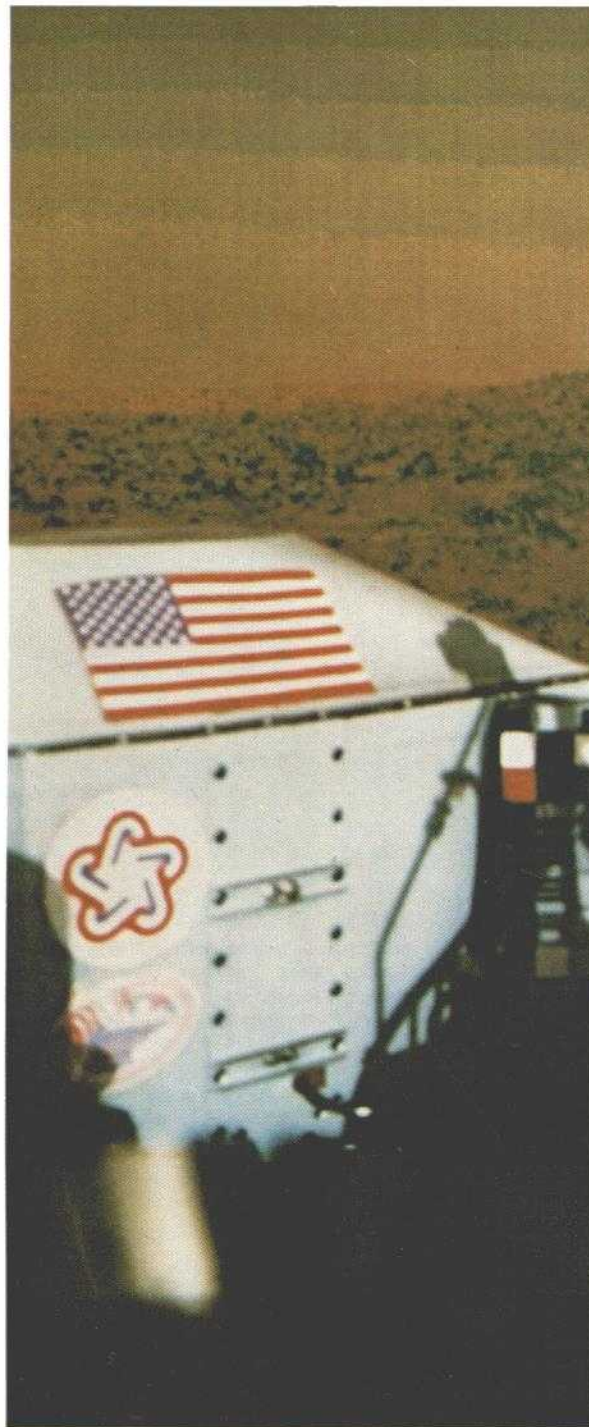


July-August 1976  
Volume 1 Number 6

# Pathways

SATELLITE

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# Pathways SATELLITE

July-August 1976  
Volume 1 Number 6

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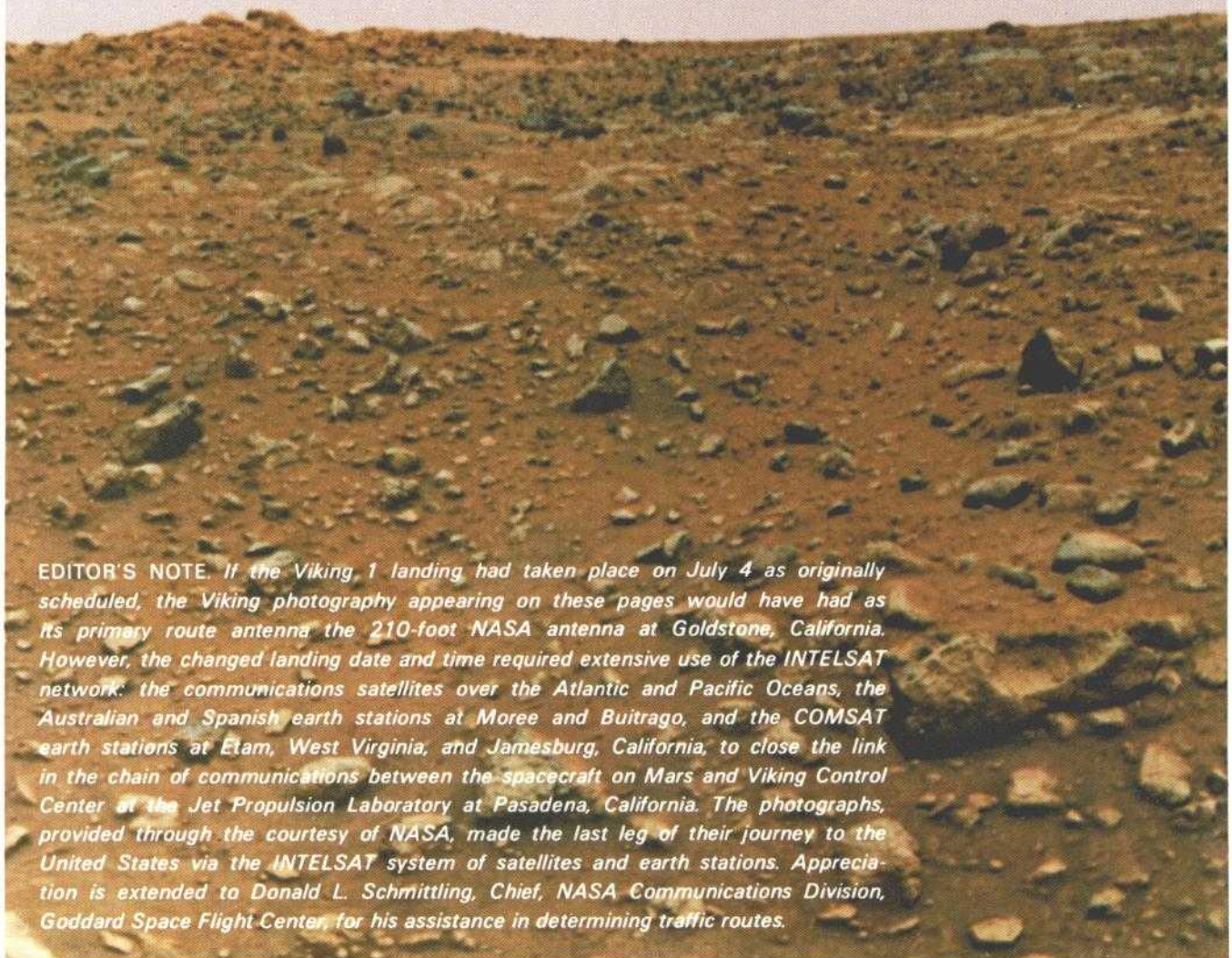
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**Cover.** On July 26 the cover photograph was transmitted to earth from the surface of Mars. This photo was chosen for the cover for several reasons, one of which is that the final leg of the photographic journey was by satellite, from the Buitrago Earth Station in Spain over the Atlantic Ocean INTELSAT IV-A to COMSAT's Earth Station at Etam, West Virginia. Other reasons for using the photograph include the view of the Martian surface and a part of the

Viking 1 Lander with various identifications visible: the Flag of the United States, the Bicentennial logo immediately below the flag and the Viking symbol. The scene in the background is looking almost due west on Mars. The lighter zone at the far horizon is about two miles from the Lander. The picture was taken at local Mars time of 7:18 a.m., hence the relatively dark sky and the far horizon illuminated by the sun just rising behind the Lander. NASA photo.

# Satellites in demand during Bicentennial month



**EDITOR'S NOTE.** *If the Viking 1 landing had taken place on July 4 as originally scheduled, the Viking photography appearing on these pages would have had as its primary route antenna the 210-foot NASA antenna at Goldstone, California. However, the changed landing date and time required extensive use of the INTELSAT network: the communications satellites over the Atlantic and Pacific Oceans, the Australian and Spanish earth stations at Moree and Buitrago, and the COMSAT earth stations at Etam, West Virginia, and Jamesburg, California, to close the link in the chain of communications between the spacecraft on Mars and Viking Control Center at the Jet Propulsion Laboratory at Pasadena, California. The photographs, provided through the courtesy of NASA, made the last leg of their journey to the United States via the INTELSAT system of satellites and earth stations. Appreciation is extended to Donald L. Schmittling, Chief, NASA Communications Division, Goddard Space Flight Center, for his assistance in determining traffic routes.*

First color photograph taken on the surface of Mars.

## Viking Mission to Mars

**M**ARS HAS EXCITED man's imagination more than any other celestial body except the Sun and the Moon. Its unusual reddish color, which the ancients associated with fire and blood, gave rise to its being named for the Roman God of War.

The invention of the astronomical telescope by Galileo in 1608 opened a new era in the observation of the planet. Instead of appearing merely as a tiny disc, Mars' surface features could be resolved.

**JULY-AUGUST 1976**

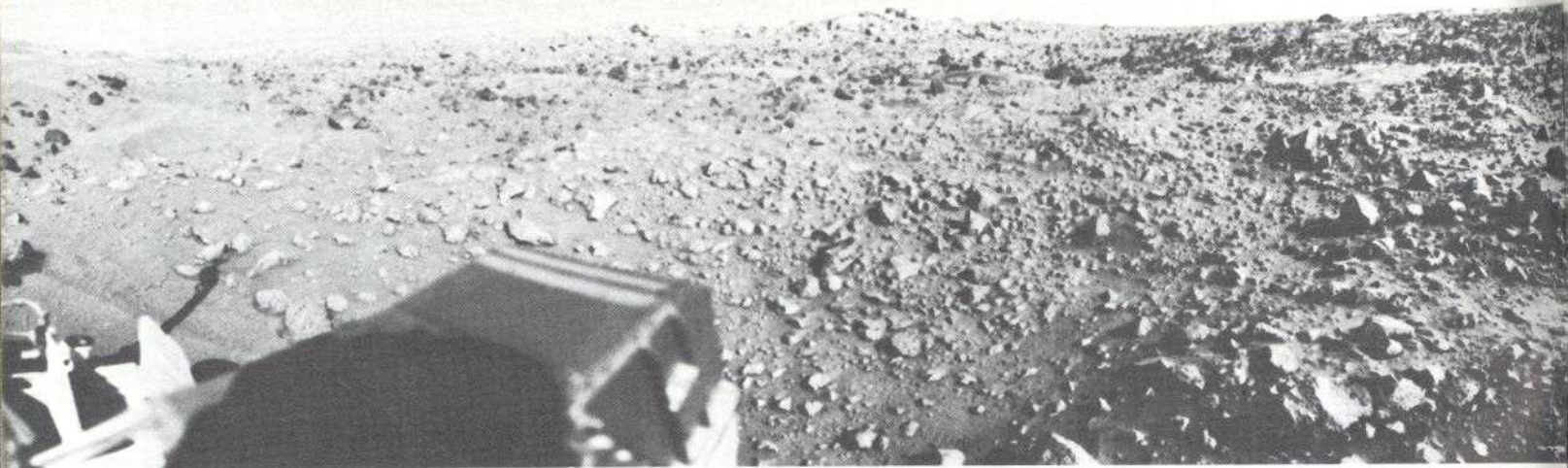
*To impress the reader with the importance of the latest scientific achievement of the United States in space exploration, the following article is reprinted from NASA's Viking Press Kit.*

THE EDITOR

Christian Huygens made the first sketch in 1659 of the dark region, Syrtis Major ("giant quicksands"). Able to observe a distinguishable feature, Huygens could show that Mars

rotated on a north-south axis like Earth, producing a day that was about half an hour longer than Earth's.

In 1666, the Italian astronomer Giovanni D. Cassini observed and sketched the Martian polar caps. Observers in the early 1700's noted changes in the surface appearance in a matter of hours, probably caused by dust storms, now known to rage periodically. In 1783, William Herschel observed that Mars' axis of rota-



*First panoramic view by Viking 1 from the surface of Mars. The out-of-focus spacecraft component at the far left is the housing for the Viking sample arm not yet deployed. To the left of the right-hand*

PHOTOS COURTESY OF NASA

tion is inclined to its orbital plane at about the same extent as Earth's, revealing that long-term changes were often associated with seasons that would result from such inclination.

In the 17th and 18th centuries, it was commonly accepted that Mars and the other planets were inhabited, but the real excitement was created by Giovanni Schiaparelli and Percival Lowell between 1877 and 1920. As a result of extensive observations, beginning with the favorable apparition of 1877, Schiaparelli constructed detailed maps with many features, including a number of dark, almost straight lines, some of them hundreds of kilometers long. He referred to them as "canali" or channels. Through mistranslation, they became "canals" and the idea of civilized societies was propagated.

Lowell's firm opinion that the canals were not natural features but the work of "intelligent creatures, alike to us in spirit but not in form," contributed to the colorful literature. To pursue his interest in the canals and Mars, he founded the Lowell Observatory near Flagstaff, Arizona, in 1894, and his writings about the canals and possible life on Mars created great public excitement near the turn of the 20th Century.

Speculation about intelligent life on Mars continued through the first

part of the century, with no possibility of an unequivocal resolution, but a gradual tendency developed among scientists to be very skeptical of the likelihood. The skepticism was reinforced by the results of two Mariner flyby missions in 1965 and 1969. The limited coverage of only about 10 per cent of the Martian surface by flyby photography indicated that Mars was a lunar-like planet with a uniformly cratered surface.

In 1971-72 the Mariner 9 Orbiter revealed a completely new and different face of Mars. Whereas the flyby coverage had seen only a single geologic regime in the cratered highlands of the southern hemisphere, Mariner 9 revealed gigantic volcanoes, a rift valley that extends a fifth of the way around the planet's circumference, and possible evidence of flowing liquid water sometime in the past. Also revealed were layered terrain in the polar regions, and the effects of dust moved by winds of several hundred kilometers an hour.

In short, Mariner 9's 7,000 detailed pictures revealed a dynamic, evolving Mars completely different from the lunar-like planet suggested by the flyby evidence. That eminently successful Orbiter mission showed a fascinating subject for scientific study and also provided the maps from

which the Viking sites have been selected.

The scientific goal of the Viking missions is to "increase our knowledge of the planet Mars with special emphasis on the search for evidence of extraterrestrial life." The scientific questions deal with the atmosphere, the surface, the planetary body, and the question of bio-organic evolution. This goal ultimately means understanding the history of the planet.

The physical and chemical composition of the atmosphere and its dynamics are of considerable interest, not only because they will extend our understanding of planetary atmospheric sciences, but because of the intense focus of interest in contemporary terrestrial atmospheric problems.

We want to understand how to model our own atmosphere more accurately, and we want to know how the solar wind interacts with the upper atmosphere; to do this we must know more about its chemistry, the composition of neutral gases and charged particles.

We want to reconstruct the physics of the atmosphere and determine its density profile. We want to measure the atmosphere down to the surface and follow its changes, daily and seasonally. From these data may come clues to the atmospheric processes

**PATHWAYS**



page, on the Lander, the low-gain antenna for receipt of commands from the earth can be seen. The horizon features are approximately 1.8 miles away. The photos together complete a 300-degree panorama.

that have been taking place and determining the planet's character.

Of special interest is the question of water on Mars. Scientific literature is sparse in data and rich in speculation. It is known that there is water in the Mars atmosphere, but the total pressure of the atmosphere (about one percent of Earth's) will not sustain any large bodies of liquid water. Nevertheless, the presence of braided channels suggests to many geologists that they are the result of previous periods of flowing water. This idea of episodic water suggests a very dynamic planet.

The geology of Mars has attracted great interest among planetologists because of the wide variety of features seen in the Mariner photos.

Volcanologists are intrigued by the high concentration of volcanoes near the Tharsis ridge. Scientists who study erosion are fascinated with the great rift valley (Valles Marineris) that is 100 kilometers (62 miles) wide, 3,000 km (1,800 mi.) long and 6 km (4 mi.) deep. Some geologists have focused on the polar region, which appears to be stratified terrain. The pole resembles a rosette; it has been suggested that this is evidence of precession (wobbling) of the poles. One important question that Viking is not likely to answer, due to payload lim-

itation, is the age of the planet.

One mystery that Viking may solve is the fate of nitrogen. So far there has been no report of nitrogen on Mars. Has it been lost by outgassing? Is it locked up in the surface as nitrates or in some organic form? Chemists and biologists both look upon nitrogen, among the most cosmically abundant of the elements, as vitally important because of the clues it provides to the evolution of the atmosphere and of the planet itself.

There is the final question of life on Mars. This may be one of the most important scientific questions of our time. It is also one of the most difficult to answer. A negative answer does not prove there is no life on Mars. The landing site may have been in the wrong place, during the wrong season, or we may have conducted the wrong experiments. Many scientists still think there is a low probability of life on Mars.

How can this extensive effort to perform the search be justified? First, it must be acknowledged that there is no evidence at present, pro or con, of the existence of life on Mars. And what we seek is evidence. The remarkable thing is that we live at a time in which we can make this first test for life, and also assemble a great store of knowledge of the planet.

Finally, we regard as of utmost importance a knowledge of the organic character of the planet. Whether life has begun or not, it is critical to our concept of chemical evolution to determine the path of carbon chemistry. Mars offers the first opportunity to gain another perspective in the cosmic history of planetary chemistry.

The scientific investigations of Viking were intentionally selected to complement one another. The Orbiter science instruments are used to help select landing sites for the Lander investigations. The Lander cameras help select soil samples for the chemical and biological analyses. The meteorology data are used to determine periods of quiet for the seismology experiment. The atmospheric data are used in determining the chemistry, which in turn is used in understanding the biological result.

But Viking's greatest asset is its flexibility. The scientist-engineer teams will be interacting, hour by hour, during the several months that Viking will be returning data. Every day will bring new discoveries and fresh ideas for improving the mission to extract the maximum benefit from this effort.

G.A. SOFFEN, *Project Scientist*

G.D. SANDS, *Associate Project Scientist*

C. SNYDER, *Orbiter Scientist*

## Viking on Mars

**I**T TOOK VIKING 1 almost a year to reach Mars after a curving flight of nearly 450 million miles.

Twenty-five seconds after touchdown, facsimile camera number two began sending the first picture back to earth from the Plains of Chryse.

Twenty minutes later, the picture sequences of the Martian surface were being assembled for release to the news media at NASA's Jet Propulsion Laboratory in California to be dispatched to the North American continent and around the world over the global system of communications satellites and earth stations.

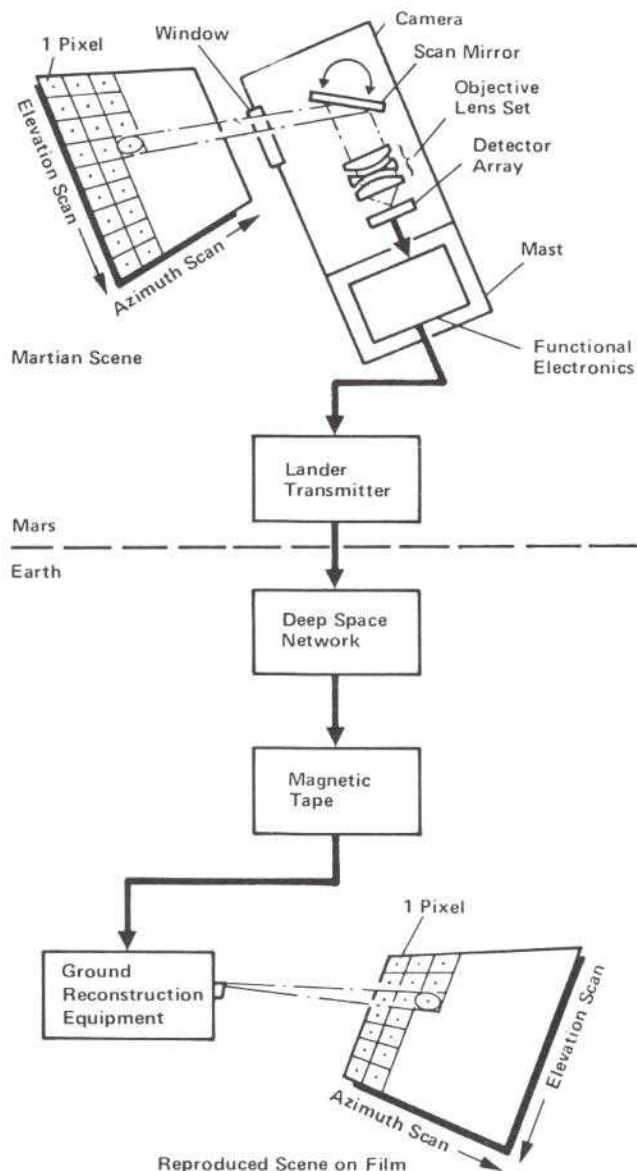
The final lap of the photographic recording of the historic event was measured in fractions of seconds in time as the first photo from the planet was beamed through space over an ocean-orbiting communications satellite to the COMSAT earth station at Etam, West Virginia, at the speed of light.

In a little more than 20 minutes after touchdown, a viewer on any continent of the world could watch as NASA's Lander photographically began its exploration of the Planet Mars from its surface 212 million miles in space.

Never before in the history of man had such a communication chain been forged in support of a single event matching the VIKING Mission.

Never before had NASA's Deep Space Network been called upon to direct, track and record deep space penetration, minus the hand of man, to such a challenging degree.

Once again, as during the earlier APOLLO missions to the moon, the international system of communications satellites and earth stations played an integral part in the year-long flight, in the landing and in carrying photographic documentation, live, to a waiting world.



Lander Camera System of Operation

The following message was sent by D. L. Schmittling, Chief, NASA Communications Division, Goddard Space Flight Center, to COMSAT's George A. Lawler, Director of Marketing.

On May 21, 1976, we solicited your support for the planetary phase of VIKING 1 and 2. That support was outstanding on July 20 when Viking 1 made its historic landing on Mars. Immediately after the landing, Mr. D. Mudgway, the JPL Deep Space Network manager for VIKING, asked that

we pass to you his personal thanks for a job well done. By way of this message, we are happy to do so. We also add our thanks for your excellent support and we anticipate it will continue through the upcoming VIKING 2 Mars orbit insertion on August 7 and subsequent landing. The communications challenge is and continues to be significant and vital to the success of the VIKING program. With your help, we in NASCOM are confident we will meet it.

## The Deep Space Network

**T**HE ANTENNAS of the "Big Three" of the Deep Space Network in California, Australia and Spain carried the traffic between the VIKING's Orbiter and the JPL Control Center during the nearly year-long flight to Mars.

Spaced at 120-degree intervals across the earth's surface, the "big dishes" of The Deep Space Network took their turns in focusing their unblinking eyes on the lonely space vehicle as it penetrated deeper into the solar system.

The COMSAT-managed system of satellites and earth stations constituting INTELSAT has constantly been in the foreground of space exploration, playing a major role in the most historic space events witnessed by man—the landing on and the probing of the lunar surface, the joint American Soviet APOLLO/SOYUZ mission, and now a Bicentennial offering, man's first view of Mars from the planet's surface.

On July 20, 1976, on the tenth anniversary of the landing of the Apollo 11 mission on the moon, the Jet Propulsion Laboratory at Pasadena, California, sent the signals through the earth station at Moree, Australia, which eventually resulted in the successful touchdown of the Lander on the Plains of Chryse.

Shortly afterward, the first high-speed photo sequences from the Martian surface began flowing into the NASA antenna at Robledo, Spain, and to the Buitrago Earth Station for further transmission over the Atlantic Ocean INTELSAT IV-A satellite to the COMSAT earth station at Etam, West Virginia, then on to Goddard Space Center at Greenbelt, Maryland, and JPL.

The clarity of the photos appearing on the earth-sited monitors challenged the imagination—to realize that the images had traveled through the lens of a facsimile camera mounted on the Lander on the Martian surface 212 million miles to the earth's surface in Spain, and by satellite to the United States and a worldwide audience. The photos were so sharp

that the rivets on the aluminum footpad of the Lander could be counted.

According to Viking Project Manager James S. Martin, Jr., of the Langley Research Center in Virginia, the actual taking of the first picture, focusing on the terrain on which a footpad of the Lander rested, took approximately five minutes with the remainder of the 20 minutes required for transmission through the VIKING Orbiter and on to earth.

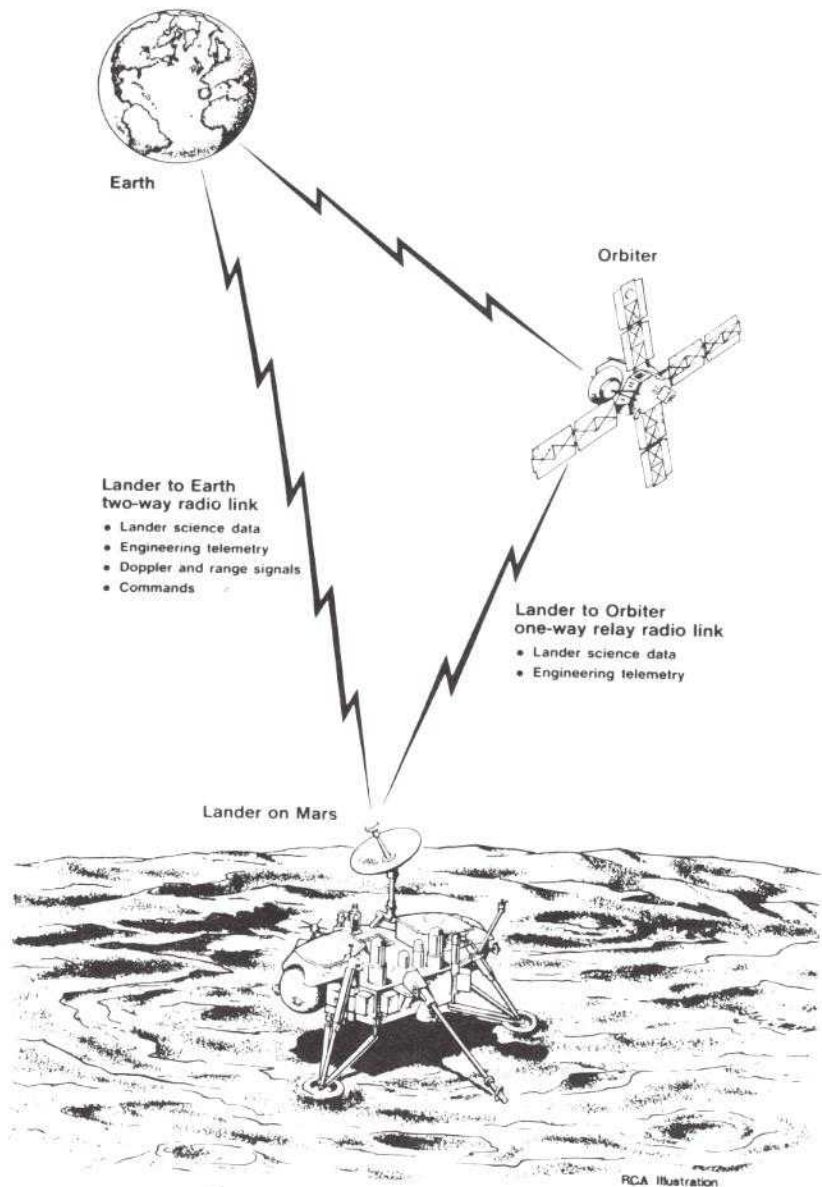
## The Cameras

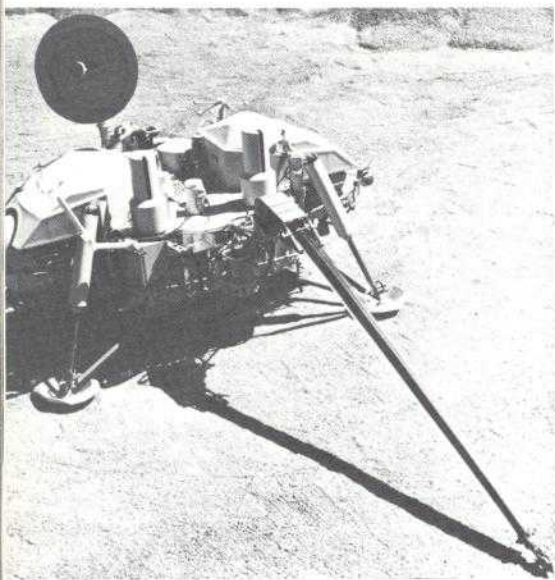
**T**HE VIKING Lander is equipped with two identical cameras posi-

tioned a little more than three feet apart, mounted on stubby masts that extend about 51 inches above the surface, and having a relatively unobstructed view across the area accessible to the surface sampler.

Facsimile cameras are fundamentally different in design from television cameras in that facsimile cameras use mechanical instead of electronic scanning. An image is produced by observing the object through sequential line scans with a nodding mirror which reflects the lights from a small element of the object being photographed. Each time the mirror

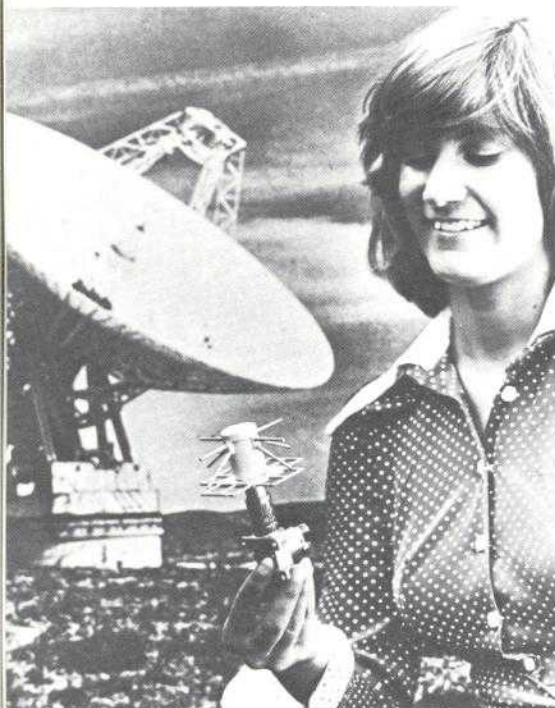
## Viking Lander Communications





The turret-like structures on the front of the Lander at each side of the soil sampler (arm extended forward) are facsimile cameras for taking pictures of the Martian surface for transmission to the earth's surface 212 million miles away.

The Lander's six-inch-high, low-gain, S-band antenna is compared to one of the Deep Space Network's 210-foot antennas on earth. Signals sent from earth more than 200 million miles away are received by the miniature antenna.



nods, one vertical line in the field of view is scanned; then the entire camera moves horizontally by a small interval and the next vertical line is scanned. The scans are accumulated slowly and a picture results.

The facsimile camera acquires data relatively slowly, line by line. Rapidly moving objects, therefore, are not accurately recorded. In response to a question about movement on the planet raised by President Ford during his congratulatory message to the Viking Team, Project Manager Martin said, "If there is a real fast movement, like an animal, I am afraid it will appear as a blur. If there is slow movement, like a rock rolling along, or a slow cloud moving by in the distance, we will probably see that go by."

The number of pictures to be sent to earth each day will vary according to the size of the pictures, amount of data to be transmitted by other instruments, and length of transmission period. According to the mission plan, a typical daily picture budget for the Lander might be one picture directly transmitted to Earth at low data rate, two pictures transmitted in real time through the Orbiter, and three pictures stored on the tape recorder and later relayed to Earth.

### The Question of Life

**W**HETHER OR NOT there is life on Mars today is the question scientists hope VIKING will answer. The analysis of data and photographs returned to earth is expected to provide evidence, negative or positive.

**The Viking News Room at the Jet Propulsion Laboratory in California reported TV crews from Canada, France, Germany, Italy, Mexico, Switzerland and the United Kingdom on site at JPL covering the Viking Mission, in addition to the U.S. media. Approximately 550 American and 75 foreign newsmen of all categories registered at JPL.**

Dr. Michael McElroy, an atmospheric scientist from Harvard University, reportedly stated that data thus far received from VIKING suggest that Mars had a nitrogen-rich atmosphere billions of years ago (Al Rossiter, UPI). Nitrogen is the key to the origin and support of earth-type life.

As the first color photo of Mars returned to Earth, revealing a reddish surface and light blue sky (later determined to be pink), Dr. Thomas A. Mutch of Brown University likened the image to a terrestrial desert scene. Dr. Mutch said the red tint (something that had been seen for centuries by earth astronomers and from which colorful appearance Mars had gained the title of the "Red Planet"), probably was caused by the weathering of iron-rich rocks which produce rusty stains.

VIKING 2, already winging its way toward Mars, is expected to land on the planet in September. The communications challenge is tremendous. Over a distance of more than two hundred million miles JPL scientists will have to maintain control and direct the research of both Orbiters and Landers.



By KIM KAISER

On June 29, Dave Reiser, Fred Seidel and I set out for Yellowstone Park, Wyoming, in a van loaded down with the equipment necessary to support NBC in broadcasting a segment of its Bicentennial Program, "The Glorious Fourth," by satellite, from Yellowstone.

As part of the Communications Technology Satellite (CTS) experimental program, the National Broadcasting Company had asked COMSAT to set up a small transportable earth terminal for the special. A second request for a similar TV broadcast of the Scottish Highland Games from Grandfather Mountain, North Carolina, on July 10, was also received from CTS experimenter Southern Educational Communications Association (SECA).

To accomplish both of these tasks within the limited time available, the COMSAT project team rented a six-wheel recreational vehicle and placed a six-foot antenna on top, using a specially constructed mount with all of the electronics inside. Eric Ackermann used a horn and orthomode transducer designed by Bob Gruner and, with the assistance of the Labs Model Shop, designed and constructed a "super" dual-polarized 12/14-GHz feed for the antenna.

On arrival at Yellowstone, the antenna was deployed in about three-and-one-half hours. Joined by Neil Helm, we participated in dry runs on July 2 and 3 with NBC's TV crew from KIFI, Pocatella, Idaho. The crew was up before the sun to prepare for the 10-hour broadcast beginning at 8 a.m. EDT on the Bicentennial Fourth.

The transmission consisted of a

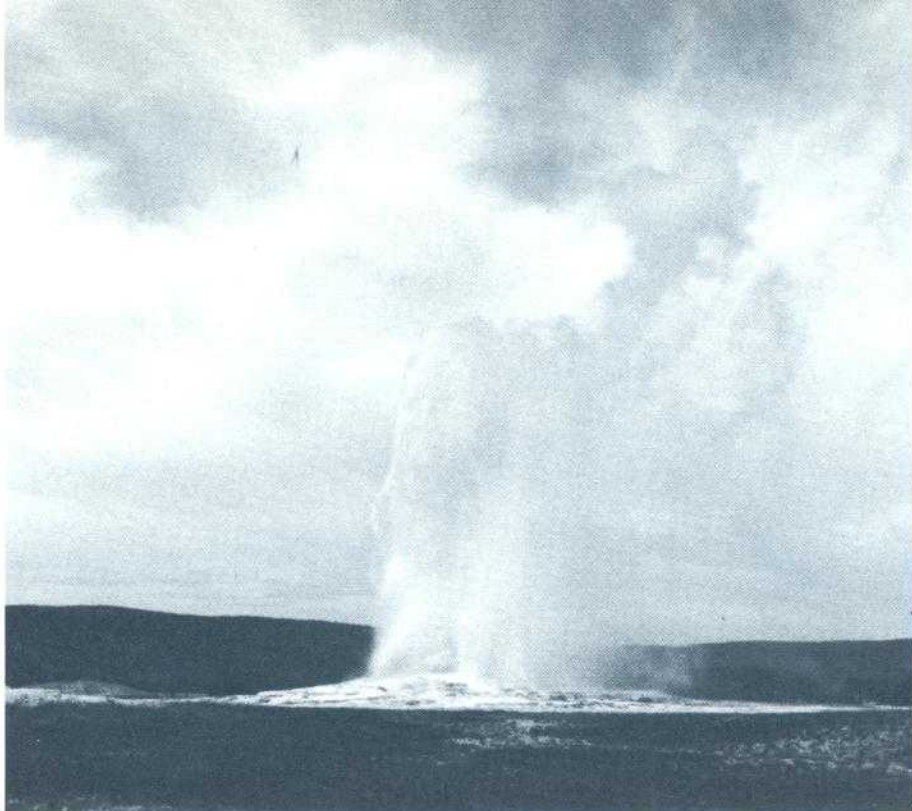
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*Mr. Kaiser is a COMSAT Labs Senior Staff Scientist.*

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*as thousands watch . . .*



*"Old Faithful" erupts . . .*

## Labs team supports NBC's "Glorious Fourth" broadcast

good-quality picture and two audio channels, one for program and the other for an order wire using transponder 1 on CTS. The signal was relayed from NASA's Lewis Research Center in Ohio to station WKYC in Cleveland and then to NBC network control in New York for broadcasting over the NBC Network. Since network TV is not received in Yellowstone, we arranged to use transponder 2 of CTS to provide two-way TV receiving the NBC program with two voice channels.

The dual up/down-converters designed and built as part of the small terminals project performed well, with all frequencies right on the mark. In fact, all systems worked perfectly and without interruption for the entire 10-hour program. This was in great measure a result of teamwork, starting with the design and construction of the six-foot terminal at the Labs and including the cooperation of the NASA Lewis CTS team, the Rangers and others at Yellowstone, and the NBC news staff, particularly Don Kivell in New York and Will Osborne, the unit manager assigned to Yellowstone.

Repacking the terminal, the COMSAT team started for the Labs on

Monday morning, July 5, making short shrift of the 2,300 miles from Yellowstone, arriving at the Labs on Wednesday afternoon. On Thursday the small four-foot terminal was loaded into Fred Seidel's station wagon with Dave Reiser as copilot. Neil Helm and I boarded the van, and we set out for Linville, North Carolina.

Despite narrow mountain roads, darkness, and drizzle, we arrived at our destination (a meadow on Grandfather Mountain) about midnight Thursday. By 5 a.m. both terminals were set up and checked out through the CTS satellite. We then spent an hour-and-a-half driving the 10 miles to our motel. It seems like all mountain roads look alike at 5 a.m. in the fog!

Later that morning, the four-foot terminal was repacked and Dave Reiser and Fred Seidel departed for Columbia, South Carolina, where that terminal was to serve as the receiving station. It was set up on the parking lot next to the South Carolina Educational TV building in less than an hour.

On Saturday, July 10, at 3 p.m. a one-hour TV broadcast of the Scottish Highland games was transmitted



*the Labs antenna transmits . . .*

live from Grandfather Mountain via cts to the South Carolina ETV station, where it was put on the Public Broadcasting Network and broadcast by over 300 stations. The camera and film feeds were provided by members of the South Carolina Educational tv staff, who were extremely cooperative.

The most tangible result of these exercises was in demonstrating that small terminals can be rapidly deployed in relatively remote areas to transmit good-quality tv in the 12/14-GHz bands. The Bicentennial

broadcast emphasized the considerable progress made by information transfer (and particularly satellite communications) in the 200-year history of the U.S. Additional experiments with cts, undoubtedly not as spectacular but equally as important, are planned for the near future. These include providing communications from a disaster, such as an earthquake, for the American Red Cross.

On January 17, 1976, cts was launched into a geostationary orbit at 116 degrees West Longitude. The three-axis-stabilized spacecraft has



*the live TV coverage.*

two transponders with 85-MHz bandwidth each. CTS is a joint U.S./Canadian experiment with COMSAT Labs as one of the approximately 20 experimenters. This writer is principal investigator and Neil Helm is evaluation coordinator. Time on the spacecraft is allocated according to an intricate schedule and averages about three hours twice per week. The spacecraft antennas are repointed for each experiment. The spacecraft has performed well, with only a minor flaw in a redundant power conditioning relay.

## USIA's worldwide "Salute by Satellite"

To commemorate the Bicentennial, the United States Information Agency arranged for a televised "Salute by Satellite," broadcasting July 4 events to more than 36 nations around the world.

According to the USIA, the "Salute by Satellite" program was "the most complex ever attempted by the agency," consisting of 15 separate messages of approximately 15 minutes each transmitted from Washington to the national tv networks of the countries involved. Each of the countries cleared time slots for reception on July 3 and 4 in recognition of America's 200th birthday.

Prominent tv correspondents from Yugoslavia, Italy, Poland, France, Portugal, Greece, Israel, Brazil and

Japan were in Washington serving as anchormen.

Each segment of the "Salute" included a Bicentennial statement videotaped by President Ford. In those transmitted to Latin America, the President was introduced by Vice President Rockefeller, speaking in Spanish, who also concluded the program with a summary statement especially addressed to Latin Americans.

"Salute by Satellite" was described by USIA Director Keogh as offering a unique opportunity for direct communications with millions of people through thousands of tv stations throughout the world. The program was intended to symbolize, he said, not only a continuing American

sense of international responsibility and involvement, but also appreciation for the contributions of many cultures to the growth of this Nation.

The various programs included materials relating to the special ties between the peoples being addressed and the United States. Demonstrations of ethnic music, dancing and other activities of specific interest abroad were prepared. The foreign newsmen "anchoring" their own programs taped pieces on location at such historic sites around Washington as the White House, the Capitol, the Lincoln and Jefferson Memorials and the Smithsonian Folk Life Festival near the Washington Monument.

On July 3, they taped on-camera commentary at the Bicentennial parade down Constitution Avenue in Washington. The July 4 programs also included, through cooperation with NBC, such commemorative

observances around the country as sunrise services at the Washington Monument and in the Grand Canyon; the parade of the "tall ships" past the Statue of Liberty in New York Harbor; and President Ford's participation in ceremonies at Valley Forge and at the Liberty Bell in Philadelphia.

The nations participating in the

"Salute by Satellite" were Argentina, Bahrain, Brazil, Chile, Colombia, Costa Rica, Egypt, El Salvador, France, Greece, Guatemala, Israel, Italy, Ivory Coast, Japan, Jordan, Kenya, Korea, Mexico, New Zealand, Nicaragua, Nigeria, Panama, the Philippines, Poland, Portugal, Qatar, Saudi Arabia, Senegal, Venezuela, Yugoslavia, Zaire and Zambia.



A "cherry picker" is used by USIA cameramen at the parade in Washington for high angle shots.

A USIA cameraman videotapes the parade for transmission overseas.

**Editor's note.** A sampling of quotes received by the U.S. Information Agency after its "Salute by Satellite" broadcast appear in italics on this page and the next.

ATHENS, GREECE—*Would appreciate Greek TV correspondent Evangelos Bisikas being informed of the great success of his "Salute" telecast July 4, which came directly in middle of prime time newscast and seen throughout Greece. His many colleagues lauded him during Ambassador's Bicentennial reception July 5, with ultimate praise coming for Deputy Director Greek TV for both Bisikas and USIA: "Now that's real television." Kudos from us all.*



Rom Evron of Israel

TEGUIGALPA, HONDURAS—*"Salute by Satellite" was transmitted nationwide directly off micro-wave at 6:00 p.m., July 4, on TV Channel 5 and repeated at 10:00 p.m. same channel. Color, video, and audio quality excellent. Total viewers for both transmissions estimated by TV studio at 1,300,000 persons. Extremely favorable commentary received on special attention given to Latin America by Vice President Rockefeller in Spanish. Post thanks and congratulates IMV for excellent program.*

LIMA, PERU—*"Salute by Satellite" received. Broadcast live (1900 - 1915 local time). For live broadcast Post feels viewing audience extremely large. In addition, Post made video tape of transmission and quickly shuttled it to Ambassador's residence for showing on six different monitors scattered through the residence to the high level audience that was there for 4th of July reception.*

BOGOTA, COLOMBIA—*Post received subject program fine. Video and audio satisfactory. Invision telecast program same time as satellite transmission; nation-wide 7:00 to 7:15 p.m. local time. Appreciate effort. Wish program could have been longer.*

CARACAS, VENEZUELA—*"Salute by Satellite" was broadcast by all four Venezuelan television networks at either 10:30 or 11:00 p.m.*

PHOTOS COURTESY OF USIA



Takashi Suetsune of Japan

TOKYO, JAPAN—*Post* congratulated IMV for outstanding success of July 4 satellite feed to Japan, resulting in nationwide telecasts of U.S. Bicentennial celebrations via NHK and all major commercial broadcast networks. NHK (receiving point of feed) highly enthusiastic over excellent audio and video quality, and particularly appreciated inclusion of natural sound. NHK officials asked *Post* to convey thanks and appreciation for exceptional effort by IMV staff and all connected with "Salute by Satellite" project.

MANAMA, BAHRAIN—Program received, broadcast by QATAR-TV. Program called quote really outstanding unquote by Director Ministry of Information.

BY STEPHEN KELLER

Our City was proud to host two of the most celebrated events of the Bicentennial Fourth of July: Operation Sail and the International Naval Review. We all had our vantage points to view the parade: Mary Ward, from the New Jersey Palisades; Ed Dooley, from the Battery; and your correspondent, from the Manhattan side of the Hudson, aboard the New York Board of Education schoolship.

Anchored along the parade route were 52 modern warships of 32 nations, ranging in size from tugs to the U.S. Navy aircraft carrier *Forrestal*. The parade route extended from the Verrazano Bridge (longest suspension bridge in the world) at the harbor entrance, to the George Washington Bridge up the Hudson River. Unfortunately, on July 2, winds destroyed what was for a few minutes, the largest flag in the world on the Verrazano Bridge.

Escorted by New York City fireboats and commercial tugs, the U.S. Coast Guard training vessel *Eagle* led the parade of "Tall Ships" past the naval vessels. The sixteen full-rigged school ships represented naval and maritime academies of fourteen nations. Construction dates of these vessels ranged from 1883 to 1968, and until 1957 such vessels were still in commercial use in the grain trade. In 1776, the British fleet supporting the Battle of Long Island was comparable to the armada we saw this year.

Following the "Tall Ships" were

*Mr. Keller is a member of COMSAT GENERAL'S New York Office.*

## From New York: "The Parade of Ships"

over 200 smaller sailing vessels from 30 nations, including schooners, brigs, junks, sloops, replicas of historic vessels, and actual working ships still under sail. Private boatowners viewed the parade from virtually everything except hollow logs. After the parade, the sailing craft and naval ships

moved to their piers, and were open to visitors before proceeding to other ports later in the week.

Operation Sail was a treat for everyone, but was especially meaningful to us here in the New York Office, because of our close association with the maritime industry.



The U.S. Coast Guard's *Eagle*



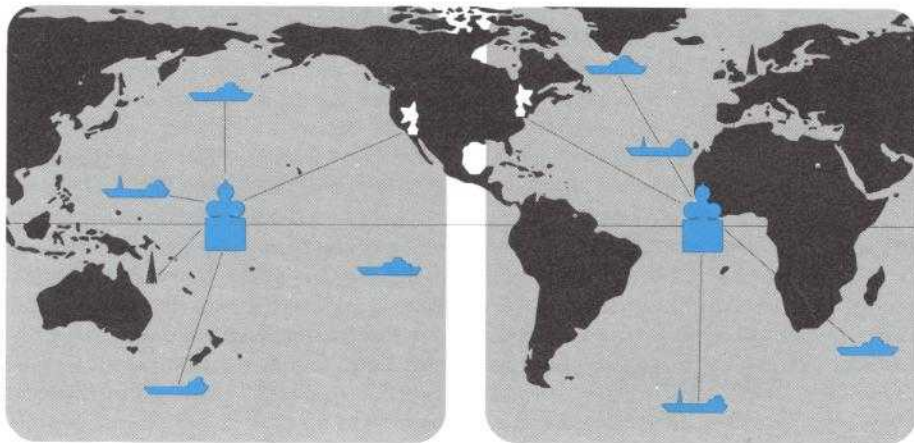
New York fireboats greet the "Tall Ships"



The *Danmark*

## Seismic survey ship reports MARISAT's telephone call "fantastic"

The MARISAT System, developed by COMSAT General, provides high-quality communications to the U.S. Navy and to the commercial shipping and offshore industries. Through satellites over the Atlantic and Pacific Oceans, the MARISAT System is capable of serving more than two-thirds of the world's major sea-lanes and more than 90 percent of the world's present offshore petroleum exploration and production areas. COMSAT General began full commercial service via the Atlantic satellite in July and the Pacific satellite in August. The first commercial telephone call was made by the seismic survey ship, *Deep Sea Explorer*, the lead vessel in SEAGAP, an oil exploration consortium composed of Phillips Petroleum, Getty Oil, AGIP, and Hispanoil.



The first commercial telephone call to go via MARISAT satellite was placed July 9 by the seismic survey ship, *Deep Sea Explorer*. The 175-foot vessel had been at sea for 32 days, searching for possible new oil sites off the coast of Madagascar in the Indian Ocean.

Using the MARISAT System, the *Deep Sea Explorer* telephoned its company offices in Oklahoma. The MARISAT satellite over the Atlantic Ocean linked the 4-foot diameter antenna on board the ship to COMSAT GENERAL's earth station at Southbury, Connecticut. From Southbury, the call was routed to Bartlesville, Oklahoma.

Ronald Payne, Quality Control Officer for the *Deep Sea Explorer*, re-

ported on the results: "I'm a former Navy man, and this is the most fantastic communications I have ever seen."

Two weeks after commercial service began, Mr. Payne was interviewed for COMSAT's "World of Music" radio program. From Washington, D.C., WGMS announcer Renee Channey talked via MARISAT to Mr. Payne aboard ship.

**Channey:** Good evening, Mr. Payne. How far from land are you?

**Payne:** At the present time, we're about 85 miles off the northwest coast of Madagascar.

**Channey:** And what is the weather like out at sea?

**Payne:** Extremely rough here lately. We've been in seas from 12 to 16

feet, winds 25 to 30 knots—some up as high as 40 knots.

**Channey:** It doesn't sound like appropriate weather for a dinner cruise. Mr. Payne, I'm absolutely amazed at how sharp and clear your voice sounds.

**Payne:** Yours, too, Renee.

**Channey:** I understand that the *Deep Sea Explorer* placed the first commercial call via the new MARISAT satellite. I suppose the MARISAT service lets you keep in close touch with your headquarters and with your family too. Is that right?

**Payne:** Yes, ma'am. That's correct.

**Channey:** Well, I know the *Deep Sea Explorer* searches for new oil sites, but how do you do that from the surface of the sea?

**Payne:** Renee, it's quite a complicated process but I'll try to break it down for you. We tow a cable submerged 50 feet below the water's surface. The cable contains pressure-sensitive devices. We also tow an array of air guns about 35 feet underwater. When these guns are triggered, high-pressure air escapes in the form of an explosion. The energy released penetrates down into the earth about six miles. As the energy passes through the different densities of the earth, it is reflected back to the earth's surface at different speeds depending on the type of formation it passes through. As it's reflected back,

it causes a pressure-change which we record in the form of an electrical impulse. The impulse is fed into an on-board computer where we amplify it, filter it, digitize it and put it on magnetic tape. We also take a plot of it on board the vessel, and from this information, we are able to locate different structures capable of bearing oil.

**Channey:** Mr. Payne, will better communications help the ship in its exploration work?

**Payne:** Yes, it will, Renee. With the MARISAT service we'll be able to keep headquarters informed daily of our progress and we'll also be able to receive any new information relating to our work in the area where we're surveying.

**Channey:** Well, a very interesting and informative conversation, Mr. Payne. And if I may say so, quite an accomplishment to be able to simply dial a person at sea half-way around the world. Best of luck in your oil exploration activities and I hope the weather settles down a little bit.

**Payne:** Thank you, Renee. We hope it does too. Thanks for calling.

### **Charyk congratulates Haiti on earth station inauguration**

COMSAT President Joseph V. Charyk congratulated Haiti by satellite on its inauguration of the Jean-Claude Duvalier Earth Station in June. Dr. Charyk's remarks, in French, were videotaped at the CBS studios in Washington and transmitted to Haiti as part of the station's inauguration ceremonies. Haiti's Ambassador to Canada, His Excellency Philippe Cantave, traveled to Washington to take part in the telecast prepared by COMSAT.

## **MARISAT system now fully operational over Atlantic and Pacific satellites**

COMSAT GENERAL Corporation began commercial service to ships at sea via the Pacific Ocean MARISAT satellite on August 15. The Pacific satellite is the second satellite to be placed in full operation. COMSAT GENERAL began providing a broad range of services via the Atlantic MARISAT satellite in July.

The U.S. Navy is leasing capacity at UHF frequencies in both MARISAT satellites for communications between its own fixed and mobile stations. Service to the Navy via the Atlantic satellite began on March 25, and via the Pacific satellite on June 28.

For commercial users, COMSAT GENERAL's tariffed offerings include

telex, telephone, facsimile and data communications between locations at sea equipped with appropriate terminals, and the shore. Commercial ships and offshore facilities can be linked via MARISAT to the world's telecommunications networks.

More than 20 commercial ships and offshore facilities at present are equipped with on-board terminals for operation with the MARISAT System, and orders are pending for terminal installations on additional vessels and on offshore facilities. COMSAT GENERAL maintains a network of sales and service agents around the world to sell or lease, install and maintain these terminals.

### **Second in series of COMSTARs launched**

At 6:04 p.m. EDT, Thursday, July 22, the second in the series of COMSTAR domestic communications satellites was launched into orbit from Cape Canaveral Air Force Station, Florida. Launched aboard an Atlas-Centaur rocket by the National Aeronautics and Space Administration for the COMSAT GENERAL Corporation, the satellite will be turned over to AT&T and General Telephone and Electronics Satellite Corporation (GSAT) after in-orbit testing.

The two companies are leasing the entire capacity of the COMSTAR system which will be composed of three satellites. The first was launched on May 13, 1976, and the third will be launched in 1978. A fourth backup satellite will be available as a spare if needed.

The new COMSTAR will be stationed at 95 degrees West Longitude over the

Equator on a line roughly south of Dallas, Texas.

Unlike recent COMSAT GENERAL satellite launches, the July 22 COMSTAR launch took place in fair weather under sunny skies. Thousands, including NASA and COMSAT GENERAL guests, witnessed the launch. As a part of its observance of the Bicentennial year, the space agency had designated July 22 as "NASA DAY." Special events that day had drawn many visitors, significantly increasing the number of persons viewing the launch.

The apogee motor was fired at 6:12 p.m. EDT, Saturday evening, July 24, thrusting the COMSTAR from its elliptical transfer orbit into an essentially circular orbit. The new satellite was expected to be on station and ready to be turned over to AT&T about the end of August.

## COMSAT files "informational" tariffs with FCC; reports second quarter earnings

The Second Quarterly Report to Shareholders discusses "informational" tariffs filed with the Federal Communications Commission in accordance with the court-ordered stay of the FCC's rate decision.

### Rate Proceedings

On June 16, the U.S. Court of Appeals for the District of Columbia Circuit granted a motion for a stay of the December 1975 decision of the Federal Communications Commission (FCC) with respect to the rates COMSAT charges for the international services provided through the INTEL-SAT system. Thus, at least until completion by the Court of its still-pending review of the rate decision, the Court's stay of the decision enables COMSAT to continue billing its communications common carrier customers at the present rates rather than at the lower rates required by the FCC's decision.

Upon granting the stay, and as proposed by COMSAT when it requested the stay, the Court directed the FCC to issue a so-called accounting and refund order to protect the interests of all parties pending the outcome of judicial review of the rate decision. The FCC has issued such an order, effective as of June 16.

As required by the FCC's order, COMSAT has filed reduced "informational" tariffs compiled on the basis of the rate decision. Although COMSAT will continue to bill carrier customers at present rates during the time in which the FCC's accounting order remains in effect, COMSAT will include as revenues in Statements of Operations during such time only amounts calculated on the basis of the rates included in the "informational" tariffs. Funds amounting to the difference between the charges collected from customers under the present rates and those reported as revenues

on the basis of the "informational" tariffs are to be set aside in an escrow account. The amounts in the escrow account, including interest earned thereon, will be subject to the possibility of refund to COMSAT customers.

Whether COMSAT ultimately will be required to make refunds and, if so, the extent of such refunds, depends on the outcome of the Court's review of the FCC's rate decision. Any amounts not refunded would be included in a restatement of the Statements of Operations for the periods in which the accounting order remains in effect, and this would increase the earnings previously reported for such periods.

The FCC's accounting order also requires COMSAT's carrier customers to file "informational" tariffs reflecting the potential cost savings to them under "informational" tariffs, and to keep accounts identifying amounts for possible refund by them to their customers. COMSAT is to assume all administrative expenses, including those of carrier customers, relating to implementation of the FCC's order.

### Summary of Operating Results

COMSAT reported Consolidated Net Income amounting to \$10,849,000, or \$1.08 per share, for the second quarter of 1976. This was a decrease from \$11,628,000, or \$1.16 per share, reported for the second quarter of 1975.

Because the FCC's accounting order was placed into effect as of June 16, and thus became applicable to the final 15 days of the second quarter of this year, a portion of second quarter revenues, amounting to \$2,100,000, is to be placed in escrow in compliance with the order and was excluded from the Statement of Operations. The after-tax effect of this procedure was to reduce Consolidated Net Income for the quarter from \$1.19 to \$1.08 per share. On the basis of COM-

SAT's computations at the time the second quarter results were determined, had the accounting order been in effect for the entire second quarter, rather than for the final 15 days only, Consolidated Net Income would have been 56 cents per share.

Including the effect of the FCC's accounting order on the final 15 days of the quarter, Net Operating Income for the second quarter of 1976 totaled \$9,758,000, or 98 cents per share; Net Operating Income for the second quarter of 1975 totaled \$9,862,000, or 99 cents per share. Operating Revenues for the second quarter of 1976 amounted to \$39,456,000, or \$4,866,000 more than those for the second quarter of last year.

For the first six months of 1976 Consolidated Net Income was \$21,890,000, or \$2.19 per share, \$2,430,000, or 24 cents per share, lower than for the first six months of 1975. The decrease from 1975 is attributable primarily to decreases in Other Income as well as to increases in Operating Expenses, lower revenues from U.S. mainland-Hawaii service and the exclusion from operating results of the amounts to be placed in escrow pursuant to the FCC's accounting order.

Net Operating Income for the first six months of 1976 totaled \$19,862,000, or \$1.99 per share, \$766,000, or eight cents per share, lower than for the first six months of 1975. Operating Revenues for the first six months of 1976 were \$76,732,000, or \$5,667,000 more than for the first half of last year.

The increases in Operating Revenues for the second quarter and the first six months from those for the comparable 1975 periods resulted primarily from continued growth in the number of half-circuits that are leased full time to COMSAT's carrier customers for overseas communications, and from initiation of both MARISAT and COMSTAR services. Revenues

from the full-time lease of half-circuits in the first half of 1976 exceeded those of the first half of 1975 by \$5,888,000. On June 30, COMSAT was leasing 4,132 half-circuits full time, an increase of 719 from the number leased on June 30, 1975.

Revenues from the lease of a satellite transponder (the equivalent of about 864 half-circuits) for U.S. mainland-Hawaii service were \$3,350,000 lower for the first half of 1976 than for the first half of last year. COMSAT's monthly charge for the leased transponder service had been reduced from \$970,000 to \$300,000 in June 1975. Revenues from the leased transponder service will be minimal in the third quarter of 1976 and nonexistent thereafter. The service was discontinued on July 26 when telephone traffic carried through the leased transponder was transferred to a do-

mestic satellite system.

Operating Expenses, including income taxes, were \$29,698,000 for the second quarter and \$56,870,000 for the first six months of 1976, \$4,970,000 and \$6,433,000 higher, respectively, than for the comparable periods of 1975. Higher depreciation charges associated with the launch of INTELSAT IV-A, MARISAT and COMSTAR satellites, and an increase in earth station use charges were major factors contributing to the increase in Operating Expenses for the respective periods.

Other Income, after provision for income taxes, totaled \$1,091,000 for the second quarter and \$2,028,000 for the first six months of 1976, \$675,000 and \$1,664,000 lower, respectively, than for the comparable periods of last year. The decline in Other Income for the respective periods is

## '76 Montreal Olympics set satellite system TV record

The 1976 Olympic Games at Montreal, Canada, became the most widely telecast event in history as a result of record use of the INTELSAT global satellite system for distribution of television coverage.

Over 930 television transmissions were sent via satellite to Asia, Europe, Latin America, the Middle East, Africa, and Australia during the games. On some days, more than 70 telecasts were transmitted via satellite. During peak periods, as many as five programs were transmitted simultaneously across the Atlantic Ocean via INTELSAT satellites.

A total of 2,585 half-channel hours of the Olympics and Olympic-related transmissions were sent by four satellites in the INTELSAT global system. This total is more than double the number of hours of the 1972 Olympics held in Munich.

For global distribution of TV coverage, two INTELSAT satellites over the Atlantic Ocean were used, as well as one satellite over the Pacific Ocean and one over the Indian Ocean.

According to press estimates from Montreal, more than one billion persons around the world viewed television coverage of the Olympics.

The overseas transmissions from Canada were routed through the Lake Cowichan, British Columbia, and Mill Village, Nova Scotia, earth stations and a transportable earth station at Montreal, all operated by Teleglobe Canada, the Canadian communications authority which handled arrangements for the global satellite services. Additional transmissions were sent through the Andover, Maine, earth station operated by COMSAT.

## Thrift and Savings Plan investments results

Funds on deposit with the Thrift and Savings Plan as of January 1, 1976, are reported to have appreciated through June 30, 1976 as follows: Fund A—3.16 percent; Fund B—17.21 percent.

principally attributable to COMSAT's share of operating expenses of Satellite Business Systems (a partnership formed in December 1975 by subsidiaries of COMSAT GENERAL Corporation, Aetna Casualty and Surety Company and IBM). Interest expense on borrowings of COMSAT GENERAL, lower investment income and a smaller allowance for funds used during construction also contributed to the reductions.

## Quarterly Dividend

At its monthly meeting in July, the Board of Directors declared a quarterly dividend of 25 cents per share. The dividend is payable on September 13 to all shareholders of record as of the close of business on August 13. It is COMSAT's 24th consecutive quarterly dividend, and the ninth at the rate of 25 cents per share.

## Tangua TTC&M Station goes operational



The INTELSAT TTC&M Station located at the Tangua Earth Station near Rio de Janeiro, Brazil, goes operational with the acceptance of the key to the Power Monitor Computer by Donald J. Pavlack, Tangua TCM Supervisor (center). Kai E. Rasmussen, Jr., a senior telecommunications engineer from Page Northrop, presents the key to Pavlack as Engineer Laercio Cattete Reis looks on.



## INTELSAT Board acts on INTELSAT V negotiations, permanent management arrangements and Director General appointment

The Twenty-second Meeting of the INTELSAT Board of Governors was held in July at INTELSAT Headquarters in Washington, D.C. Twenty-five Governors representing 73 Signatories were present. With the accession of Mali, INTELSAT currently has ninety-five members. This was the first meeting presided over by the Board's new officers, Mr. Colino of the United States as Chairman and Mr. Villarejo of Spain as Vice Chairman. In accordance with the Board's Rules of Procedure, Mr. Colino designated Mr. Irving Goldstein to participate and vote for the United States.

Among the key items at this meeting, the Board adopted its report to the Assembly of Parties on permanent management arrangements, appointed Mr. Santiago Astrain the Director General, and authorized the Management Services Contractor (MSC) to continue INTELSAT V contract negotiations only with Aeronutronic Ford, and to submit to the September Board meeting a complete draft INTELSAT V contract. Among its other actions the Board:

### Technical and Operational Matters

- Unanimously endorsed the correctness of the MSC's decision not to consider or evaluate proposals submitted following July 14, 1976, the date set by the MSC for submission of the final price proposals concerning the INTELSAT V program.

- Unanimously decided that effective immediately neither the Board nor the MSC shall accept, consider or evaluate any proposals concerning the provision of satellites unless they have been submitted in response to a formal request by INTELSAT following a decision of the Board.

- Decided to meet September 7 to 9 for the sole purpose of considering the INTELSAT V program. This meeting will consider the MSC's analysis and recommendations concerning the total INTELSAT V program, including launch vehicles, the space segment program with regard to the

timing and number of spacecraft required, an overall cost analysis of the INTELSAT V program including analysis of any possible alternatives to be identified, operational plans and the final negotiated INTELSAT V contract.

- Decided that the draft INTELSAT V contract will provide for a fixed price arrangement in accordance with Aeronutronic Ford's best and final prices in their alternative proposal, performance incentives of 33.3 percent, and spacecraft compatibility with both Atlas/Centaur and shuttle launch vehicles.

- Authorized the MSC to explore with NASA the costs and proper mix of Atlas Centaur and STS Vehicles appropriate for the INTELSAT V program.

- Instructed the MSC to discuss with the European Space Agency more definitive cost, schedule and technical compatibility details for the Ariane launch vehicle, and to continue to evaluate the progress of the program for timely consideration as a possible INTELSAT V launch vehicle.

- Requested the Advisory Committee on Technical Matters (BG/T) and the MSC to expedite development of an INTELSAT specification for in-band program audio transmission equipment, in order that the Board may consider such a specification as soon as possible.

- Requested the MSC to study the feasibility and details, including costs, of a possible sidelobe measurement program of the existing INTELSAT earth stations.

- Decided to consider at its October meeting factors pertaining to Standard B earth stations, including procedural, technical and operational considerations and charging factors, and adoption of an SCPC/FM specification.

- Requested the Secretary General to provide to the BG/T information regarding the number of program audio and additional cue/commentary channels which will best sat-

isfy user requirements in the INTELSAT system, and requested the MSC to contact BBC and SEL to obtain information concerning the patent and licensing situation associated with the production of their equipment.

- Requested the MSC in its further studies of operational plans involving an Atlantic INTELSAT V satellite at 340.5 degrees to include identification of possible economic benefits in both the earth segment and space segment that could be associated with the introduction of an inter-regional satellite in the vicinity of 340.5 degrees/345 degrees East Longitude, as well as identification of the advantages and disadvantages of each location in attracting new services.

- Requested the Secretary General to examine the problems, if any, that could arise in effecting inter-system coordination with other systems if INTELSAT sought to locate a satellite at 345 degrees East Longitude.

- Approved the study of long-range forecasting techniques recommended by the Advisory Committee on Planning, and definitions of short and long-term periods for INTELSAT's planning purposes.

- Approved the amendments to the INTELSAT contracts for provision of TT&C services by EMBRTEL (Brazil) and INTEL CAM (Cameroon) monitoring stations.

- Approved a contract to INTEL CAM, the low bidders, for provision of an additional TTC&M antenna and associated services.

- Authorized the MSC to procure additional telemetry and data processing equipment for installation at the Zamengoe, Cameroon, earth station at an estimated cost of \$90,000.

- Established a charge of \$120,000 per launch during 1979 for use of INTELSAT TT&C services in connection with RCA-AED's launch of two Brazilian domestic satellites, and authorized the MSC to conclude an agreement with RCA-AED, should they

be awarded a contract for launch of the Brazilian domestic satellites, for the provision of TT&C services on terms and conditions similar to those contained in the existing Agreement with RCA-AED.

- Requested the Secretary General and the MSC to review the charges for use by other organizations of INTELSAT TT&C facilities in connection with the launch of non-INTELSAT satellites.

- Authorized the MSC and the Secretary General to negotiate with COMSAT GENERAL an amendment to the present TT&C agreement for the provision of additional TT&C services requested by COMSAT GENERAL. The draft amendment, together with recommendations on appropriate charges for such services, will be considered by the Board in October.

- Decided that the extension of the U.S. MARISAT system in the Atlantic and Pacific Regions through 1981 will result in no unacceptable technical interference and, based on present plans, will not result in any significant economic harm to INTELSAT through 1981. Any material extension of the system or widening of its scope would require reconsideration.

- Decided to tender advice to the Assembly of Parties that: the introduction of the U.S. MARISAT satellite system in the Indian Ocean region will result in no unacceptable technical interference to the INTELSAT system; based on present plans will not result in any significant economic harm to INTELSAT through 1981; and will not prejudice the establishment of direct telecommunications links through the INTELSAT space segment among all the participants. This advice is based upon the assumption that any material extension of the system beyond 1981 or widening of its scope would be the subject of a new submission and coordination under Article xiv(d).

- Requested the Advisory Committee on Technical Matters to review the Board's findings that no unacceptable technical interference is to be expected from the U.S. MARISAT system in the Atlantic, Pacific and Indian Ocean Regions.

- Approved a proposed Memorandum of Understanding (MOU) with Brazil, and expressed, in the form of a recommendation pursuant to Ar-

icle xiv (c) of the Agreement, the finding that on the basis of adherence to the conditions set forth in the proposed MOU no unacceptable interference is expected from the Brazilian domestic system into the INTELSAT system.

- Decided to tender advice to the Assembly of Parties, pursuant to Article xiv (e) of the Agreement, that no unacceptable technical interference is to be expected from the proposed Japanese Geostationary Meteorological Satellite Network.

- Expressed the finding that no unacceptable interference is expected from the Orbital Test Satellite experimental network, based on information presented by France on behalf of Germany, Belgium, Denmark, France, Italy, Netherlands, UK, Sweden, and Switzerland, or from the Italian SIRIO experimental satellite, if the networks are operated and have the characteristics assumed for the interference calculations, and such characteristics are filed with the IFRB. The Board noted that the finding with respect to OTS is based on a 1977/78 launch date and an estimated three-year lifetime, and the SIRIO finding on a 1977 launch date and an estimated three-year lifetime.

- Decided to lend INTELSAT's ion thruster to NASA for research, under a written agreement which will provide, *inter alia*: that there will be no cost or liability to INTELSAT; that NASA will assume risks for loss or damage except for reasonable wear and tear; and the data generated in NASA's research will be made available to INTELSAT on an unrestricted use basis.

- Approved 13 Nigerian stations for operation with the Nigerian leased transponders, subject to verification of the stations' measured performance characteristics and operation in accordance with the transponder leases.

- Approved an Italian station at Lario for access free of charge to the Atlantic major path satellite to conduct rain depolarization measurements from August 1, 1976, through September 30, 1977.

#### **Organizational and Administrative Matters**

- Approved a series of recommendations by the Working Group on

Permanent Management Arrangements and unanimously adopted its Report on Permanent Management Arrangements for submission to the Assembly of Parties and transmittal to the Meeting of Signatories and to all Parties and Signatories. The Report invites the Assembly to adopt the recommended organizational structure of the Executive Organ consisting of the Director General and three Deputy Directors General, respectively, for Finance, Administration, and Operations and Development, reporting directly to the Director General. The management functions are allocated between those to be performed in-house and those to be contracted out in two separate contracts to the same entity, recognizing that the Director General will be directly responsible for the performance of all management functions. The arrangements for contracting out shall be in accord with Articles XIII and 16 of the INTELSAT Agreements. The report indicates that the Board considers action by the Assembly at its second meeting to adopt the recommendation of the Report will assist the Director General on his assumption of office to initiate a smooth and orderly transition; and that the Director General and the Board must retain flexibility to make changes in the allocation of functions within the Executive Organ at levels below those reporting directly to the Director General.

- Requested the Secretary to convene an extraordinary meeting of the Meeting of Signatories 23-24 September 1976, in Nairobi, Kenya, for the purpose of considering the Board's report, and to add an item to the Agenda of the Assembly of Parties. The Board requested the presence of the management consultant, Mr. K. McKechnie of W.D. Scott and Company, at the Meeting of Signatories and Assembly of Parties, and authorized the Secretary General to make the necessary arrangements.

- Appointed Mr. Santiago Astrain the Director General of INTELSAT, and approved a report to the Assembly of Parties recommending that it confirm this appointment.

- Decided to submit to the Second Meeting of the Assembly of Parties for decision the draft Head-

quarters Agreement, covering privileges, exemptions and immunities referred to in Article xv(c) of the INTELSAT Agreement, and to recommend that the Assembly approve the proposed Agreement.

- Approved the required reports to the Second Assembly of Parties; reaffirmed the decision taken at its Eighth Meeting to maintain the present form of the Summary Record, and decided to tender to the Assembly the recommendation that it ratify the agreement establishing formal relations between INTELSAT and the Intergovernmental Maritime Consultative Organization (IMCO).

- Requested the Secretary General to initiate discussions with ITU officials with respect to the establishment of formal relations between INTELSAT and the ITU, to determine whether the draft agreement is acceptable to the ITU and to return to the Board with its recommendations.

- Authorized the Secretary General to request INTELSAT's participation in an advisory capacity in the January 1977 ITU WARC for the planning of the broadcasting satellite service.

- Approved a four-month extension

to the assignment of Dr. Jonathan Mass, a nominee of the Signatory of Israel.

### Legal and Financial Matters

- Established a temporary Special Committee on Financial Policies and Procedures, which is to carry out a comprehensive review of INTELSAT policies with particular attention to utilization and revenue forecasting; a multi-year financial plan; financial policies for research and development; depreciation, accounting and budgets; the Board's budget review process; and the terms of reference of the Advisory Committee on Finance.

- Adopted a general policy establishing sanctions for default in payment of utilization charges. INTELSAT will not grant any additional allotments including occasional use service to any Signatory or non-Signatory allottee over 180 days in default, and would so inform all others concerned. If a Signatory continued in default, the Board would consider whether to apply Article xvi(b)(ii) of the Agreement and recommend withdrawal. If the default persisted,

the Board could decide to terminate existing services.

- Decided that INTELSAT will not institute a legal action against General Dynamics or NASA for recovery of damages resulting from the INTELSAT IV (F-6) launch failure.

- Authorized the Management Services Contractor to negotiate with interested entities draft agreements to license nickel hydrogen cell and digital echo canceller technology. The licensing agreements will provide for front-end payments from \$5,000 to \$10,000 and royalty rates from two to five percent; and will be on a non-discriminatory basis among all licensees and subject to final review and approval by the Board.

The Twenty-third Meeting of the Board of Governors will be held September 7-9 solely for the purpose of considering the INTELSAT V program. The Twenty-fourth Meeting will commence on October 27, 1976.

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*The preceding report was prepared by Ellen D. Hoff, International Affairs, U.S. INTELSAT Division.*

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## New INTELSAT traffic data base shows pattern of long-term growth for system

The new INTELSAT traffic data base resulting from the annual INTELSAT Global Traffic Meeting, concluded in July, shows a continued pattern of long-term growth for the INTELSAT system with the forecast indicating about 22,000 telephone circuits in operation in the system by 1980.

According to INTELSAT, this growth represents an increase of six percent over previous forecasts for this time period.

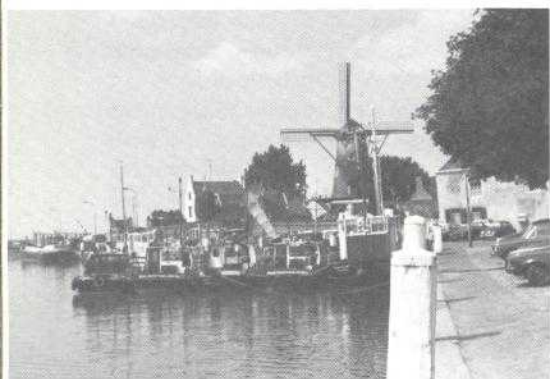
Representatives of 74 countries, 134 in all, achieved the following results during their one-week meeting

in Washington, D.C.: prepared a revised forecast of INTELSAT capacity requirements for the five-year period 1976-1980; noted a significant increase in the number of international traffic streams being placed on the system; and became aware of plans for construction of many new Standard B earth stations (with antennas approximately 10 meters in diameter).

The rapid growth in the number of earth station-to-earth station pathways within the INTELSAT system has served to make the process of coordinating service requirements between

pairs of correspondents increasingly difficult. When service began in the Atlantic Ocean Region in 1965, it was possible to establish only one pathway at a time. Today, there are over 400 earth station-to-earth station pathways around the globe.

The traffic data base will be used as a planning tool for devising appropriate satellite configurations, frequency plans and carrier assignments; and for anticipating long-term requirements and aiding in the design of future generations of satellites.



Boats tied up along a canal.



A view of the countryside.



John Welch and Bob Bourne use their free time to tour one of the dams in the Netherlands part of the Delta Project, a project of flood control and land reclamation.

*The 21st Meeting of the INTELSAT Board of Governors was held in The Hague in the Netherlands. The following story was prepared by Betty W. Poulsen of the INTELSAT Management Division who attended the Meeting.*

The Twenty-first Board of Governors Meeting was held in The Hague in the Netherlands. The Netherlands Post, Telephone and Telegraph Company provided an almost exact duplication of the meeting facilities in Washington, allocating to the meeting the entire ninth floor of one of the PTT buildings. A delightful added touch to the excellent support the PTT provided the meeting as host were the lovely flowers cut daily and placed in the offices and conference room. Although the Netherlands Administration could not claim full credit for the weather, it was mostly moderate and sunny.

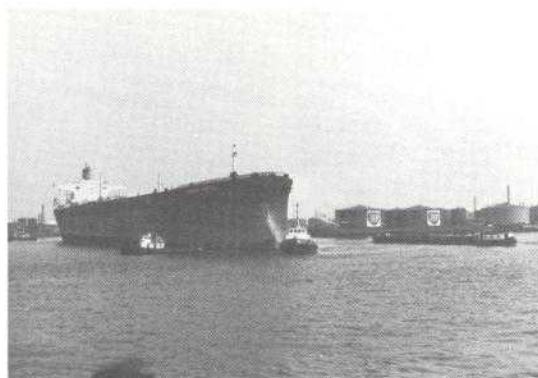
At the opening of the meeting, Mr. William G. Geddes, Chairman of the Board, introduced Mr. Ph. Leenman, the Director General of Netherlands PTT, who welcomed the Board to the Netherlands. At the end of the first day's proceedings a bus was provided to take the Board and various staff members to a lovely country mansion

## Meeting in The Hague to sample people

which had at one time belonged to an oil company executive, but now was used by the PTT as a training center for their senior officers. A welcoming reception was hosted there by Mr. and Mrs. Leenman. The good things for which Holland is famous were served: herring, cheese, beer and a unique Dutch drink, Jenever. Flowers, usual in a Dutch home, were in abundance everywhere. We missed by a week or so seeing the world famous Holland tulips.

Holland's windmills, while not extinct, are much less in evidence. Of the thousands of windmills once in use, less than a thousand remain, many of which were built in the 1700s.

On Friday evening, the European Space Agency hosted a tour and cocktail party at its facilities at ESTEC in Noordwijk. We were shown, among other things, a manned space lab to be launched in the 1980s. At the conclusion of the tour we were escorted to the top floor of ESTEC to the employee's cafeteria (overlooking dunes and, beyond, the sea) where tables groaned under the weight of the pâté, shrimp, herring, salmon, smoked eel, crab, fish, and other salads,



Rotterdam Harbor

## provides opportunity and customs

bread, cheeses, fruit, relishes, pastries, champagne, beer and coffee.

On Saturday, many of the staff and delegates visited Amsterdam. The Hague (Den Haag) and Amsterdam are very different in character: Den Haag is a city without the hustle and bustle of most modern cities; Amsterdam has more people (especially young people), more cars, trolleys and trains, more bicycles and motor bikes. Den Haag is described as being the "early to bed" town but Amsterdam is a lively place even at midnight.

Sunday was another beautiful day (the weather, of course, was arranged by the PTT) and we were treated to a tour in the southwestern section of Holland. Our guides, on two buses, were Hans Abma, the Chief of Public Relations of the PTT press and publicity service, and his assistant, Peter Odnot. The tour took us to one of the sites of the Delta Project, a reclamation program affording a fresh water supply and protection against erosion of land and the hazards of winter storms. One such storm in 1953 flooded a large area of the small country and claimed 2,500 lives. We visited one of the villages that had been flooded.



*One of the towns inundated in the flood of 1953.*

The highlight of the Sunday trip was a boat tour of Rotterdam harbor, the second largest harbor in the world. An excursion boat took us on an hour-long tour where we saw ships from all over the world moored waiting either to load or unload their wares. While cruising through the harbor we were served hors d'oeuvres, Jenever, beer, orange juice and brandy, provided by our considerate host.

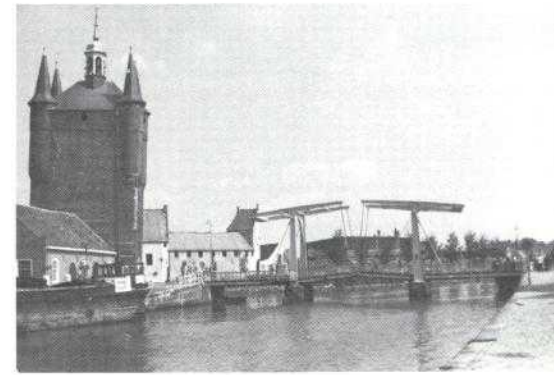
Monday and Tuesday were long working days and, on Wednesday evening, the PTT hosted a farewell dinner in "De Kloosterhoeve" restaurant in Harmelen. Not many people have the opportunity to dine in a structure that was built in 1288. This quiet restaurant had been part of a dairy farm in the 13th century. There were hooks on the rafters that had been used to hang cheese, ropes now holding tables had once been part of a scale. When we arrived drinks were served in the part of the barn that had housed the animals. To the accompaniment of the piano and violin, played by staff members of the PTT, we dined on a variety of salads and vegetables, chicken, baked Alaska, brandy and coffee. The more energetic guests danced, shaking the rafters of the old barn. At midnight the buses headed "home" after a fond farewell. Working and socializing in Den Haag was a pleasant experience.



*Amsterdam scene*



*The Plaza in Amsterdam—gathering place for the young.*



*Barge and drawbridge are familiar characteristics of the Netherlands' canal system.*

## Labs SPEC system doubles capacity of standard PCM telephone trunk

COMSAT Laboratories exhibited their Speech Predictive Encoding Communications (SPEC) system at the International Conference on Communications (ICC) at the Marriott Hotel in Philadelphia, Pennsylvania, in June.

The SPEC demonstration consisted of a phone booth at each end of the exhibit, which allowed the ICC attendees to talk over a simulated satellite circuit with the SPEC system demonstrating a 2-1 increase in the number of voice grade circuits. In addition, a switch was provided in the phone booth enabling the attendee to compare SPEC to a standard 8-bit companded PCM.

The SPEC system was set up to accommodate the traffic in a TDM capacity of 24 PCM time slots. For the demonstration, a traffic loading of approximately 85 percent was simulated,

representing a peak period of telephone usage. The simulated traffic consisted of 38 two-way conversations (supplied by pre-recorded tapes); one in-band data signal at a rate of 4800 bps; and a 1 kHz test zone for signal-to-noise ratio measurements.

The general comments received from the participants at the demonstration revealed that the SPEC circuit offered no perceptible degradation when compared to a standard PCM circuit. The quality of the SPEC circuit was rated as good as the normal overseas satellite circuit, while the system was effectively doubling the capacity of a standard PCM telephone trunk. The COMSAT Laboratories' team consisted of Robert P. Rigins, Jack Reiser and Ronald Kuenzli of the Communications Processing Laboratory, and Neil Helm of the Development Applications Department.



Robert Ridings of the Labs describes the SPEC exhibit to one of the ICC attendees at the International Conference in Philadelphia while Ron Kuenzli looks on. Exhibit demonstrator Linda Rosata is in the foreground.

## COMSAT exhibit at NAACP Convention in Memphis



COMSAT representative Glenda Cooper greets a young visitor to the COMSAT exhibit.

COMSAT was among the approximately 200 exhibitors participating in the Commerce and Industry Show at the 67th National Association for the Advancement of Colored People (NAACP) Convention held in late June and early July at the Everett R. Cook Convention Center in Memphis, Tennessee. Among the corporations, government agencies and non-profit organizations from throughout the United States exhibiting were the American Telephone and Telegraph Company (AT&T), Brown and Williamson Tobacco Corporation, the Census Bureau, Delta Airlines, General Motors, IBM Corporation, Lockheed Aircraft, the Veterans Administration and others.

## Lockett/Lister appointed to editorial advisory boards

William B. Lockett, Assistant Director of Personnel for Equal Employment Opportunity and Human Resources Development, has been named to the Editorial Advisory Board of *EEO Today*, a quarterly journal on the management of Equal Employment Opportunity programs.

Another member of the Personnel Office has received a similar appointment. Brenda Lister, Administrator of Training, has been invited to serve on the Editorial Advisory Board of *Training*, a magazine devoted to articles on human resources development.

Ms. Lister's appointment grew out of her participation in the recent 1976 Annual Conference of the American Society of Training and Development in New Orleans where she was elected to a second term on the National Board of Directors as Chairperson of the Women's Caucus.

## Labs radio amateurs participate in nationwide simulated emergency test

BY JOE KASSER

While most people were spending their weekend with their families, the members of the COMSAT and IBM Gaithersburg Amateur Radio Clubs along with Satellite Business System (SBS) "Hams" participated in a nationwide simulated Emergency Communication Test.

This test, commonly known as "field day," is organized by the American Radio Relay League (ARRL) to prepare radio amateurs for any emergency situation. Such practice events prepare hams to establish communication facilities for stricken areas within minutes of the occurrence of any disaster. In fact, when Hurricane Agnes struck the East Coast in 1972, many radio amateurs had already prepared for field day that weekend and were able to convert to the real thing in minutes.

Three different radio stations were deployed on Saturday morning in the parking area at COMSAT Laboratories. A slingshot was used to hurl a fishing line with an attached sinker high into the trees, which line was then used to pull long wire antennas high into the air. Directional beam antennas on antenna towers were erected by the combined manpower of the participants. Tents were put up to protect the equipment and operators from the weather.

At the same time the Clarksburg station was being set up, amateur radio operators all over the United States and Canada were doing the same. The result, nearly 1,400 contacts were made from the Labs area, the vast majority with other special field day stations in Canada and the 50 states, but some also with amateur stations as far away as Venezuela and Yugoslavia. Over 550 of these contacts were made using International Morse code.

Special efforts were made to make

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*Mr. Kasser is a member of the technical staff at the Labs.*

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The AMSAT-OSCAR 7 spacecraft used for communication during the recent Field Day is shown undergoing testing in the Labs Anechoic Chamber. Shown in the photo are Amateur Radio Club operators (standing, left to right), Dave Weinreich (WA2VUJ), Laurie Gray (K3AK), Joe Kasser (G3ZCZ), Don Damman (WA2PAG), Dave Reiser (WA3TRS), all of COMSAT, and P. Klein (K3JTE) of AMSAT; and (kneeling), Cal Cotner (K4JSI) of COMSAT.

one contact using a "natural" power supply (a power supply independent of batteries or fossil fuel, such as the gasoline used to power emergency generators) on Sunday morning. John Hannssen pedaled away on a bicycle connected to a salvaged automobile generator providing muscle power for a radio transceiver to make that "natural" power contact with a "field day" station in Florida. John had spent most of Saturday night hooking up and testing his generator apparatus.

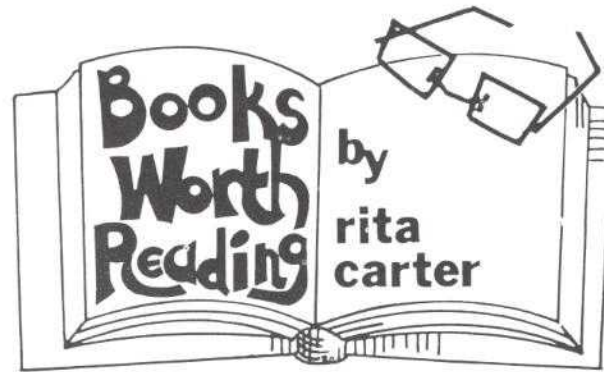
Also on Sunday morning, contact was established with a field day station in Illinois by means of the amateur radio AMSAT-OSCAR (Orbiting Satellites Carrying Amateur Radio) satellites. These satellites were built by radio hams in their spare time and were launched by NASA on a space available basis, much like a standby passenger gets a ride on a scheduled aircraft flight. These satellites are used by educational institutions to bring the subjects of space sciences and orbital mechanics to life and into

the classroom.

The OSCAR equipment was set up in a car using a simple Citizens Band style mobile antenna to receive signals from the spacecraft and a transmitting antenna assembled from aluminum angle and plexiglass at a cost of less than two dollars. Ten minutes before the satellite was due to appear above the horizon, the main piece of equipment vanished in a cloud of smoke. However, a hurried lash-up of various other units was effective and the satellite contact made.

It is fitting that the OSCAR satellites were used by the COMSAT Amateur Radio Club since the club had been active in part of the test program of the AMSAT-OSCAR 7 spacecraft prior to its launch.

Field Day this year had a special bicentennial significance to some of our participants. Two of them were English and their Amateur Radio Licenses, originally issued by the British Government, had been endorsed by the FCC for operation within the United States.



Below is an alphabetical listing of books recently received in the Central Library.

- Advanced Engineering Mathematics. WYLIE, C. RAY.
- Advances in Communication Systems. Vol. 4 Theory and Application. VITERBI, A. J.
- Appraising Managers as Managers. KOONTZ, HAROLD D.
- Astronomy and Cosmology. HOYLE, FRED.
- The Budget of the U.S. Government. G.P.O. 1976.
- Building Construction Cost Data, 1976. GODFREY, ROBERT S.
- Communications Channels: Characterization and Behavior. GOLDBERG, B.
- A Concise Guide to Clear Writing. GILBERT, M. B.
- The Design of Real Time Applications. BLACKMAN, MAURICE.
- Developing Tomorrow's Managers Today. DINSMORE, F.
- Digital Design with Standard MSI & LSI. BLAKESLEE, THOMAS R.
- Digital Principles and Applications. MALVINO, A. P.
- Electrical Engineering for Professional Engineers Examinations. CONSTANCE, JOHN D.
- Engineering Economics for Professional Engineers. KURTZ, MAX.
- The Engineer's Companion. MOTT, SOUNDERS.
- Fire Suppression and Detection Systems. GLENCOE.
- Goal Setting, the Key to Individual and Organizational Effectiveness. HUGHES, CHARLES.
- Handbook for Electronics Engineering Technicians. KAUFMAN, MILTON.
- Handbook for Engineer's Fundamentals. SOUDERS, M.
- Handbook of Successful Operating Systems and Procedures. PRENTICE-HALL EDITORIAL STAFF, 1964.
- Handling Employee Questions About Pay. PETRIE, D. J.
- A History of Engineering and Science in the Bell System. FAGEN, M. S.
- The Human Side of Accident Prevention. MARGOLIS, B. L.
- The Human Side of Enterprise. MCGREGOR, DOUGLAS.
- Imperial Earth. CLARKE, A.
- Integrated Circuits in Digital Electronics. BARNA, ARPAD.
- International Commercial Satellite Communications. SNOW, MARCEL-LUS.
- The International Telecommunication Union. CODDING, G.
- Introduction to Microcomputers and Microprocessors. BARNA, ARPAD.
- Large-Scale Networks: Theory and Design. BOESCH, F. T.
- Management and Organizational Development. ARGYRIS, C.
- Managerial Finance. WESTON, J.
- Marketing Technology Products. MANCUSO, J.
- Microwave Diode Control Devices. GARVER, ROBERT.
- Microwave Integrated Circuits. GUPTA, K. C.
- Microwave Mobile Communications. JAKES, WILLIAM C.
- The Modern Employment Function. SWEET, DONALD.
- NFPA Handbook of the National Electric Code. SUMMERS, W.
- Noise Reduction Techniques in Electronic Systems. OTT, HENRY W.
- Office Work Measurement. NANCE, H. W.
- Optical Fiber Technology. GLOGE, DETLEF.
- Outer Space and Inner Sanctums. KINSLEY, MICHAEL.
- Personnel Interviewing and Practice. LOPEZ, FELIX.
- Principles of Aperture and Array System Design. STEINBERG, B.
- Queueing Systems. Vols. I, II. KLEINROCK.
- Radio Operator's License Q & A Manual. KAUFMAN, MILTON.
- The Snobol 4 Programming Language. GRISWOLD, R.
- Spread Spectrum Systems. DIXON, R. C.
- The Shadow Government. GUTTMAN, D.
- Statistical Methods in Radio Wave Propagation. HOFFMAN, W. C.
- Syntony and Spark: The Origins of Radio. AITKEN, HUGH G.
- Systems Analysis. OPTNER, STANFORD L.
- Systems Engineering Methodology for Interdisciplinary Teams. WYMORE, A.
- Technology Diffusion. HOUGH, GRANVILLE.
- Telecommunication Transmission Handbook. FREEMAN, ROGER L.
- Telephone, The First Hundred Years. BROOKS, JOHN.
- Television Factbook. TELEVISION DIGEST, INC., 1976.
- Transactional Analysis on the Job. ALBANO, C.
- Transmission and Display of Pictorial Information. PEARSON, D. E.
- U.S. Industrial Outlook. G.P.O., 1976.
- Wages and Salaries: A Handbook for Line Managers. SIBSON, ROBERT E.
- Word Processing. ANDERSON, T. J.

To request items from this list, please see the Central Librarian. (Reference S.P.I. 40-2)



## Network Bits

### Field Correspondents

#### Andover

Joanne Witas

#### Brewster

Dorothy Buckingham

#### Cayey

John Gonzalez

#### COMSAT General (Plaza)

Jen Baldwin

#### Etam

Bev Conner

#### Fucino

Sandy Tull

#### Jamesburg

Warren Neu

#### Labs

Carol Van Der Weele

#### M & S Center

Darleen Jones

#### New York

Stephen Keller

#### Paumalu

Bob Kumasaka

#### Plaza

Gloria Lipfert

#### Santa Paula

Pat Hogan

#### Southbury

Eileen Jacobsen

**CAYEY.** The hurricane season is on us for awhile bringing with it the possibility of communications interruptions including telephone outages. Knowing that Andover's Earth Station engineer **Ralph Summerton** was an active "Ham," this correspondent (KP4DEY) worked out a plan with Ralph to make sure Cayey was never completely without some kind of communications.

A successful test was carried out recently with Ralph (WA1VCV) operating from his home and **Jack Conner** (WA1MMC) from the Andover site. Your correspondent operated from Cayey. Even using inefficient long wire antenna at Cayey, communication was good between the three participants on 20 meters and 15 meters. We hope to try 10 meters one of these days.

Now if a hurricane descends on our island, at least we can talk to someone stateside and have emergency communications. Other stations interested in joining our group are welcome. The present frequencies are 14.26 MHz and 21.298 MHz.

—John J. Gonzalez

**ETAM.** **Linda Formella**, daughter of Mr. and Mrs. **John Formella**, recently won a \$5,000 scholarship for writing a Bicentennial theme for the NBC Network. Linda competed nationwide, and was the recipient for the Southeastern portion of the United States.

One dark, dreary morning at approximately 3:00 a.m., when making a routine inspection of the antenna areas, **Bill Bell** encountered a not so friendly bobcat. Warned of its presence by a very distinct scream, Bill immediately came to a halt (you can tell by the skid marks on the pavement), and made a fast getaway back into the station. As Bill put it, "It scared the \_\_\_\_\_ out of me."

Our Administrator, **Chester Randolph**, has been off with a broken leg. **Chet** was working on his patio when he fell from a bench, breaking his right leg below the knee. **Chet** is at home, leg in a cast, resting as comfortably as can be expected.

Several employees and their families have been vacationing: The **Bill Mays** and **Sam St. Clair** families went camping at Disneyworld; **Spencer Everly** and family vacationed at Myrtle Beach; the John Formellas vacationed in Wisconsin; the **Paul Helfgotts** spent a week in New York and are now camping in Donegal, Pennsylvania; the **Mike Britners** camped at Williamsburg, Virginia; and **Roger Parsons** and family spent a week at Ocean City.

**Bill Bell** spent a week in the Moundville Hospital for some tests, but I am happy to report, he is back at the "old grind" once again and seems as chipper as ever. Another fish luncheon was sponsored by the CEA in June.

The modification of the Etam I antenna continues. The old feed and cover have been removed. Installation of the new feed and cover should be completed in September.

—Bev Conner

**GENEVA.** **Julia Elizabeth Ulans**, daughter of **Roman** and **Morwenna Ulans** of the Geneva Office, graduated from the University of California at Davis last June. A few days after graduation her father gave her in marriage to **Thian Buck Lim**, a Singaporean, whom she met when her father directed the Asia Office

in Singapore. The Ulans used the event of the wedding to gather together the clan for a family reunion at the home of their oldest daughter in Mill Valley, California.

**JAMESBURG.** **Larry Cisneros** became the first Jamesburg member to reach the plateau of the COMSAT 10-year employee. He was presented with a certificate from COMSAT President **Charyk** by **H. William Wood**, Vice President, U.S. INTELSAT Division, who was visiting the station as a representative to the ESOC Meeting held recently in Carmel Valley.



VP H. William Wood presents 10-year certificate to Jamesburg's Larry Cisneros.

The Earth Stations Owners Committee (ESOC) Meeting was held at the Quail Lodge in Carmel Valley. Several members visited the station and were treated to escorted tours of the facilities. Their interest in the station was obvious from the many specific questions asked. Although they were seemingly reluc-



Touring Jamesburg during the ESOC Meeting were, left to right, Western Union International's Mr. and Mrs. Eugene O'Neill, COMSAT's Lawrence M. Devore and William L. Callaway, AT&T's Robert Newman and John S. Hannon, Jr., of COMSAT.

tant to leave our site we were able to make their return trip more interesting by pointing out the most enjoyable and scenic route for the trip back.

—W.E. Neu

**M&S CENTER.** Heading the vacation list are **George and Ellen Robertson** to Hilton Head, South Carolina; **Bud and Erma Kennedy** to Golden Lake, Ontario, Canada; **Barbara and Hugh Hutchens** spent time in Tennessee sight-seeing and attending the Grand Ole Opry; **Floyd Thompson** and family to North Litchfield near Myrtle Beach, South Carolina, fishing (according to Floyd he caught all the fish in the ocean); **Pierce and Ann Stine** took a trip to Kings Dominion and Busch Gardens in Virginia. **Jim and Liz Warren** vacationed in Ohio, however, Jim does not consider painting a house much of a vacation. **Betty Hall** and family joined her parents and went through the Smoky Mountains taking in the scenery.

Congratulations to **Dennis Jones**, son of **Darleen and Laird Jones**, on his recent marriage to **Pamela Hendricks**. It was a June wedding.

After the terrifying ordeal of going through Europe's worst recorded earthquake, the mother and aunt of **Hank Schutzbier** came to visit **Hank** in July and enjoy the peace and quiet of country living in Frederick county, Maryland. The quake's epicentre was in the area of his home town of Garizia, in northeastern Italy. His immediate family and relatives, happy to report, suffered no personal injuries although their homes sustained considerable damage. Conditions became intolerable as after-shocks prevented them from reoccupying the houses, forcing them to live in a public garden in the town's center along with several hundred other inhabitants. They are scheduled to return to Italy in August.

The M&S Center welcomes new employees **Carol Upole, Jackie Cade, Vito Visaggio and Don Rounsaville**. A luncheon was held for **Ray Juhl** who is on a year's leave of absence and residing in Mesa, Arizona.

—**Darleen Jones**

**PAUMALU.** While thousands of mainland vacationers are visiting Hawaii during this Bicentennial Year, many "Hawaiians" are in turn spending their vacations on the Mainland. Paumalu's travelers during the summer included **Stan Holt**, Operations Supervisor, who, with his family,

## Labs Closeup

### BETTY LINTHICUM, Cashier

BY SHIRLEY TAYLOR

A face familiar to everyone at the Labs is that of Betty Linthicum, Labs Cashier. Known as "Betty Cashier" (to avoid confusion with "Betty Nurse"), Betty has been Cashier since 1970, when she transferred into the Labs Finance Department from Office Services. She came to COMSAT in 1969, after working several years at GEICO and Frederick and Suburban Hospitals. As Cashier she is a member of the Budget and Program Control Department, managed by Harry F. Jones.

In her job as Cashier, Betty has a wide variety of duties and responsibilities. On a daily basis she reimburses employees for petty cash vouchers, advances funds for travel, cashes personal checks, audits travel expense vouchers and maintains control of auto rental cards, makes a trip to the Clarksburg bank and Post Office, maintains a travel log, records capital equipment purchase requisitions, balances her cash drawer, sells postage stamps, and, for all those people who do not read carefully (or at all!), interprets SPI policies.

In addition, on a regular basis, she provides travelers' cheques and keeps records of them, makes reimbursement of travel expenses, prepares capital equipment and various budget reports, and participates in special projects as may be assigned. She is also a member of the Labs First Aid team and is on call for the Nurse in her absence as needed.

Born Betty Johnson in Sandy Spring, Maryland, the eldest of three girls, she was raised on a dairy farm and graduated from Damascus High School in 1963. The same year she married Dwight Lee Linthicum. The couple are parents of two children, Juanita and Dwight Jr.

Very shortly after their marriage,

toured Western Canada and the West Coast. **Eddie Miyatake**, TTC&M Supervisor, visited Disneyland and other places of interest in California with his family. **Tamotsu Iwamoto**, Sen-



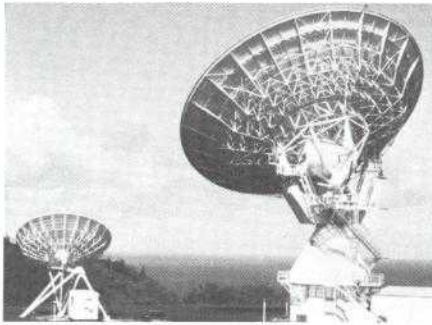
Betty Linthicum, Labs cashier

Dwight was the victim of a freak accident while at work for the Montgomery County, Maryland, Board of Education. He was electrocuted by a high voltage wire but his life was saved by the quick thinking of a Physical Education instructor on the scene who administered mouth-to-mouth resuscitation. Dwight miraculously survived, but his shoulder was shattered, and it has to be operated on regularly every six or seven months. He still works for the school board, and also farms part time.

In 1967 the Linthicums purchased their own home in Hyattstown, Maryland, some six miles from the Labs in Clarksburg. Both Betty and Dwight are active in the Hyattstown Fire Department, where he serves as a volunteer fireman, and she is on the ladies' auxiliary. In their "spare" time, the Linthicums, with several members of his family, rent and work two farms, one of 195 acres near Comus, Maryland, and one about 245 acres. The latter is planted in corn, but the former supports beef cattle, chickens, rabbits, pigs, and crops such as corn, oats, wheat and barley.

Betty likes outdoor activities, particularly water sports, and vacations at the beach whenever possible. She enjoys country music, but her greatest love, for which she is famous around the Labs, is Elvis Presley. His pictures adorn her office and his music "sends" her into outer space. Her most treasured memory is of seeing him in person, and her ambition is to go to Las Vegas to see him again.

ior Technician, and his family visited friends and relatives on the West Coast, while **Ken Yamashita**, Station Engineer, wife **Imi** and daughter **Gail**, spent two weeks touring Ore-



The 33-foot Marisat antenna appears dwarfed by the familiar PAM-1 97-foot antenna.

gon, Nevada, and California.

June 12, 1976, marked the tenth anniversary of service with COMSAT for nine Paumalu employees. During a brief ceremony to honor these employees, Station Manager **Glenn Vinqvist** presented a letter of congratulation from **Dr. Charyk** to **Ken Yamashita**, **Eddie Miyatake**, **Stanley Holt**, **Allan Prevo**, **Norman Kato**, **Ronald Miyasato**, **Timothy Kolb**, **Tom Ota**, and **John Vollrath**. The nine employees joined **Charles Ogata** and **Charles Wong** as members of Paumalu's "Ten-Year Club".

Also joining the club, having completed 10 years service with COMSAT,



Lily Miram tries on her 10-year award necklace assisted by Al Prevo while 10-year COMSAT veterans (left to right) Tom Ota, Charles Wong, Ken Yamashita and Station Manager Vinqvist look on.

is **Lily S. Miram**, Paumalu's Accounting/Personnel Clerk. A Paumalu staffer since August 3, 1966, **Lily** is the only "wahine" employee on station. Lily was presented with her 10-year award, a necklace, along with a letter from **Dr. Charyk**, by **Glenn Vinqvist**.

The Hale Ohana Camp, a private beach camp in Haleiwa, was the site for the annual Paumalu CEA sponsored picnic for station employees and their families in August. Members of Team 3, led by Operations Supervisor **Charles Ogata**, planned and organized this year's picnic assisted by

**Norman Murakami**, **Bill Osborn**, **Paul Koike** and **Tamotsu Iwamoto**.

Visitors to the station have been treated to a rare sight since early May when the 33-foot MARISAT antenna was erected approximately 100 feet from the familiar PAM-1 antenna. Standing nearly 40 feet high, the latest antenna addition at Paumalu, the fourth on station, is dwarfed by the larger 97-foot PAM-1 antenna, which has been a landmark installation at Paumalu since 1966. The MARISAT transportable terminal was used for in-orbit testing and check-out of the MARISAT F-2 satellite.

—**Bob Kumasaka**

**PLAZA.** Our best wishes to **Bob Carl** of Analysis and Traffic on his retirement from COMSAT on July 30 after 10 years of service. Bob enlisted in the U.S. Navy in his home town of Cleveland, Ohio, in 1934. He was commissioned an Ensign in 1942 while serving at Pearl Harbor in Hawaii. In 1956, he retired from the Navy as a Lieutenant Commander while stationed with the U.S. Navy Security Group in Washington, D.C. Bob worked for RCA and Philco before joining COMSAT in 1966. He and Mrs. Carl plan to remain in the Washington area.

**Don Ross** reports that he had a great visit to the "magnificent" Greek Earth Station at Thermopylae. The station decor features marble floors and statues and the grounds contain a lovely small chapel. Don also mentioned how much he liked their tropical working hours, 7:30 a.m.-2:30 p.m.

**Paul Troutman** drove 8,400 miles and visited 17 states on his vacation. Highlights of his trip included visits to Lake Tahoe, the Grand Tetons and the Arch in St. Louis. While we experienced 90 degree heat in Washington, **Don Tucker** spent four weeks in North Dakota. He claims he slept under blankets every night.

Welcome aboard to Communication Center Operators **Roscoe Drummond** and **Landon McKenzie**.

—**Gloria Lipfert**

**SANTA PAULA.** The station is having a very active summer with COMSTAR launches in May and July, a MARISAT launch in June and scheduled commercial MARISAT communication service in August. Despite the

busy schedule several of the station personnel have managed to take vacations. **Gordon Johnson** spent a week camping in the Sierra Mountains far away from telephones, alarms and spacecraft tests. **J. Gnass** went on a week long, 1,000-mile bicycle tour in northern California, which he insists was a vacation. **J. Peasley** enjoyed his last weekend trip to **San Diego** so much he went back for a vacation.

**K. Jesinghaus** is enjoying life as a summer bachelor while his wife attends a training session at the FAA Academy in Oklahoma City. **J. Castorina** transferred here from the Jamesburg Earth Station in May, but returns there on most of his shift breaks. We expect him to complete his relocation here by the end of the summer.

—**Pat Hogan**

**SOUTHBURY.** Two new employees have joined the station, **Cynthia Bachyrycz**, part-time MARISAT Communications Operator, and **Frank Makray**, Communications Technician.

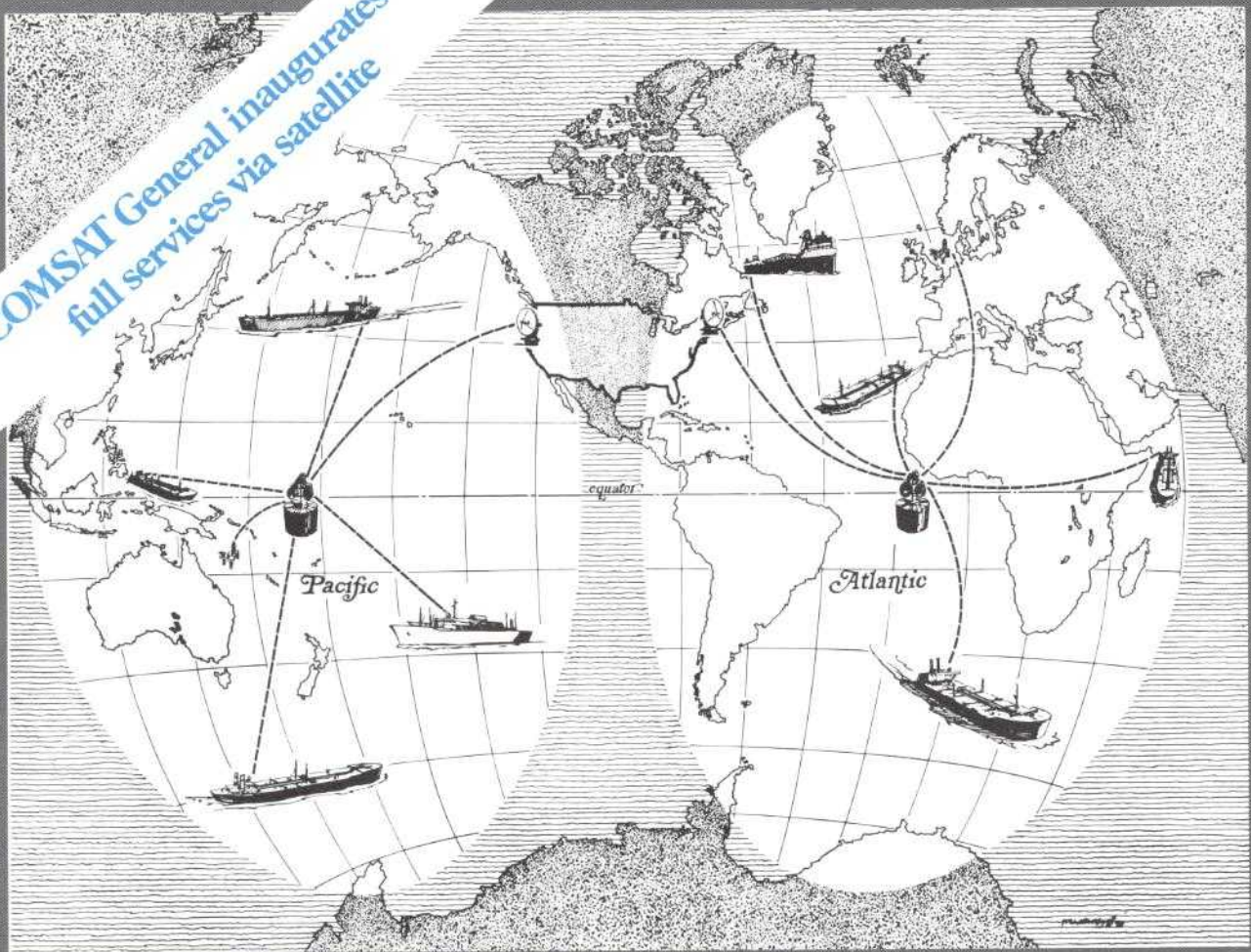
Much of the attention here at the station has been focusing on the MARISAT Commercial Operations with the commencement of commercial voice service for MARISAT on July 9. Operators **Dolores Raneri**, **Constance Sarles** and **Cynthia Bachyrycz** have been applying their background and training in making this a successful operation.

In July, the Southbury Earth Station Employees' Association (SESEA) held its first annual picnic at the site. **Roger Miner**, SESEA President, directed all the arrangements with the help of **Constance Sarles**. There were ample food and beverages for the employees and their families. Volley ball, badminton and croquet games were organized by **Ronnie Hicks** and **Jim Nelson**. The weather was excellent and everyone had a good time.

The vegetable gardens on site are doing very well in spite of the blackbirds. **Bart Bartlett** and **Constance Sarles** will have an enormous corn crop, tomatoes will be in abundance as well as squash, beans, and other vegetables.

—**Eileen Jacobsen**

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full services via satellite**



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September-October 1976  
Volume 1 Number 7

# Pathways

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**INTELSAT's Director General Astrain**

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Cover. INTELSAT's first Director General, Santiago Astrain. An artist's portrait by Suzy Ro.

# Astrain appointed INTELSAT's First Director General

News flashed from Nairobi September 28:  
**ASSEMBLY OF PARTIES UNANI-  
MOUSLY CONFIRMS SANTIAGO  
ASTRAIN DIRECTOR GENERAL OF  
INTELSAT.**



*Santiago Astrain*

BY STEPHEN D. SMOKE

**I**N A FRACTION of a second the message from Nairobi was relayed by the global communications satellite system owned by the 94 member-nation International Telecommunications Satellite Organization (INTELSAT) to such cities as Santiago, Chile, where Mr. Astrain was born; New York City where he helped obtain support for his country's electrical development program; and Washington, D.C., where INTELSAT is headquartered and where Mr. Astrain currently serves as its Secretary General.

*Mr. Smoke is Manager, Publications, Office of Public Information.*

## **Selected Over Stiff Competition**

Mr. Astrain's appointment as Director General of INTELSAT came as no surprise to the world's telecommunications industry. Three years ago Mr. Astrain was chosen over stiff international competition to fill the post of Secretary General, which had come into being on February 12, 1973, when the INTELSAT Definitive Agreements superseded the Interim Agreements which established INTELSAT on August 20, 1964.

From the day he took office as Secretary General, on September 1, 1973, his task was formidable. Not only did

he have to complete within three years the first phase of restructuring the INTELSAT organization, he had to do it to the satisfaction of three elements of a governing structure: a 25-man Board of Governors, representing 73 countries; a Meeting of Signatories, made up of the telecommunications entities which finance the global satellite system; and an Assembly of Parties composed of representatives of the respective INTELSAT member governments. Moreover, he had to do it under terms of the Definitive Agreements which specified that the Secretary General was to be succeeded by a



Santiago Astrain, New York representative of ENDESA (standing at left), and Joaquin Figuero, New York office director of CORFO, observe Walter Miller, Chilean Ambassador to the U.S., and W.A.B. Iliff, Vice President of the World Bank, sign a \$32.5 million loan agreement in Washington, D.C., in December 1959 for Chile's further electric power development.

Director General by December 31, 1976.

Mr. Astrain's performance as Secretary General obviously spoke for itself. When the time came to appoint the first Director General, the Board of Governors again selected him over international competition, and the Assembly of Parties has now confirmed the appointment. Having met the test, Mr. Astrain will assume his new post on December 31 for a six-year term of office.

### The Early Years

Mr. Astrain is the son of a Chilean businessman. Entering the University of Chile in 1936, he pursued a six-year course of study in Civil and Electrical Engineering, and graduated in 1943 as an electrical engineer.

"I wasn't an athlete, or campus leader, or anything like that," Mr. Astrain says when asked about his extracurricular activities, but despite his denials, the record shows that he was the recipient of the Marcos Orrego Puelma Award. This award is granted annually by the Chilean Institute of

Engineers to the outstanding student of the graduating class, selected on the basis of academic achievement and a vote of his classmates.

As late as the 1930's, electrical power was scarce in Chile. But things were about to change and progress was to be dramatic in the 20 years after Mr. Astrain's graduation from the University. A new government corporation, Corporacion de Fomento (CORFO), was formed in 1939 to promote the development of the country's economy. From its ranks emerged some of Chile's prominent social and industrial leaders in oil, power, steel, transportation and communications. Mr. Astrain was to become one of those leaders, first in electrical power and then in communications.

"I had flirted with the idea of going into mining," Mr. Astrain admits, "but Chile needed power and I chose that route." So, even before he received his professional degree, he went to work as an engineer with the National Electric Power Company (ENDESA), a subsidiary of CORFO. At the same time, he taught electrical engi-

neering at the University, where he was to continue teaching on-and-off for 25 years—first as a student Associate Professor, then later as Professor of Electrical Theory, Electrical Engineering, and Electrical Systems, respectively. Since education was free in Chile, teaching at the University, Mr. Astrain says, was regarded by many as a way of "paying back the University for the education we received."

In reminiscing about his teaching experiences, Mr. Astrain says that one of his greatest satisfactions came in finding that many of his former students were to become his close associates in ENDESA's power development program and, later, with ENTEL-Chile, a subsidiary of ENDESA.

Shortly after graduation from the University in 1943, Mr. Astrain married his childhood sweetheart, María Caridad ("Cary") Elempuru. Before

*(Continued on page 4)*



Signing of contract in 1965 for the northern microwave system, Santiago to Arica (2,000 km), left to right: (seated) James Conduit, representative of General Electric Company of England; Mr. Astrain, General Manager, ENTEL; (standing) Roberto Cofre, Engineer, ENTEL; Manuel Rojas, Head of Finance, ENTEL; and Jorge Rodriguez, Legal Advisor, ENTEL.



*Question:* Mr. Astrain, what will be your primary concerns in your new position as Director General of INTELSAT?

**Mr. Astrain:** Many challenges lie ahead, just as they did when I assumed the post of Secretary General. The challenges will be different, however, and very likely more difficult. During my tenure as Secretary General, INTELSAT was concerned primarily with the development of advanced satellites and matters related to the transition in organizational structure under the Definitive Agreements. When I assume office as Director General, we will have still other organizational changes to make, but the role of the INTELSAT system in world communications will be our major concern.

*Question:* The INTELSAT system has revolutionized world communications; what are the important issues still to be resolved?

**Mr. Astrain:** There are two major questions: one relates to satellite systems coordination; the other relates to cable-satellite systems competition. Both have a substantial impact on the economics of satellite communications.

*Question:* What are the problems involved in satellite systems coordination?

**Mr. Astrain:** The INTELSAT system, by international agreement, was conceived as a single global communications satellite system. A satellite, however, can be used to provide domestic or regional (multi-country) services, as well as global services. Regional systems would obviously deprive the INTELSAT system of traffic, as would domestic systems which could be served more efficiently by the INTELSAT system. Moreover, there is already a problem with satellite parking space in the geosynchronous orbit around the earth. The major communications

markets are so uniquely clustered geographically that a relatively few satellites can accomplish what a growing number of countries are trying to accomplish by launching their own domestic satellites. If satellite proliferation continues, it will result in serious technical and economic problems not only for INTELSAT, but for the whole concept of satellite communications.

**An interview  
with the  
Director General**

*Question:* Doesn't INTELSAT, with 94 Signatories, have a satellite inter-system coordination process?

**Mr. Astrain:** Yes, it does, but INTELSAT has no authority to act as an international policeman. Even the International Telecommunication Union (ITU), which is charged with the main international responsibility for inter-system coordination, has only limited enforcement powers. However, the matter of satellite intersystem coordination will be given serious consideration during the ITU's World Administrative Radio Conference, scheduled to meet in 1979.

*Question:* In the United States we hear a great deal about the cable-satellite controversy. You also mentioned this subject. What does it mean to INTELSAT?

**Mr. Astrain:** This is a subject that is of major concern to INTELSAT, to COMSAT, and to all of the developing countries, many of which are completely dependent on satellite communications for international service. The developing countries constitute an increasing percentage of the INTELSAT membership. Very simply, the economics of any communications system depend largely on the extent to which the available capacity is being used. The public, worldwide, will never benefit fully from the economic potential of satellite technology as long as extensive satellite and cable capacity remains only partially used. This is a matter that must be resolved on an international basis in the near future.

*Question:* Do I note some small measure of concern about INTELSAT's future in the face of incursions by both cable and satellite systems?

**Mr. Astrain:** Not at all. No other means of communication can meet the world's needs as well as the satellite can. This is witnessed by the fact that the INTELSAT system already carries a major portion of all international communications, and more than half of all transoceanic communications. In addition, many countries—Algeria, Brazil, France, Malaysia, Nigeria, Norway and Spain, and many others to come—are using INTELSAT satellites for domestic communications. The INTELSAT V satellites, which we will begin to launch in 1979, represent the most cost-effective communications planning, even when compared to the most advanced design for alternative means of transmission. The fundamental question, therefore, is: will the countries of the world permit INTELSAT to fulfill the role of which it is capable in achieving the common purpose of high-quality telecommunications? We must find the answer to that question.

## Director General

(Continued from page 2)

the end of that year the newlyweds were on their way to New York, where Mr. Astrain was assigned to ENDESA's New York office to supervise construction of the machinery and equipment being purchased in the U.S. for use in Chile's electrification program. Aside from the professional satisfaction derived from his first overseas assignment, that period in New York was particularly memorable for Mr. Astrain and his wife, for it was there that their daughter was born.

Three years later, he was recalled to Chile and appointed engineer in charge of ENDESA's electrical installations in Santiago. His performance earned him advancement in 1951 to Chief of ENDESA's Electrical Engineering Division, where he was in charge of engineering, design, construction supervision and procurement of all of ENDESA's electrical installations, including power and telecommunications plants.

In 1958, it was back to New York again. This time Mr. Astrain was placed in charge of ENDESA's New York office, supervising the procurement and financing of more electrical equipment for Chile, which he bought in Europe and Japan, as well as the United States. He was becoming well schooled in the intricacies of industrial financing and procurement on four continents.

By 1960, a strong base had been established in Chile's electrification program and Mr. Astrain was called home for one of his biggest assignments: the reorganization of ENDESA which, by then, had 8,000 employees and was well along in its program to meet the country's rural and industrial power requirements.

### ENTEL-Chile's First Chief Executive

It might have been the year 1964 that put Mr. Astrain on the road to his present position. Chile was in dire need of improved communications, both domestic and international. Mr. Astrain was given the responsibility



As Chief Executive of ENTEL-Chile, which constructed the first earth station for satellite communications in Latin America, Mr. Astrain, right, greets Eduardo Frei, President of Chile, at the dedication of the Longovilo Earth Station on July 28, 1968.

by CORFO to develop plans and organize a new subsidiary, ENTEL-Chile, to increase the country's overall communications capability. ENTEL-Chile was established in December 1964, and Mr. Astrain was appointed its first Chief Executive. During his six-year tenure as head of the organization, ENTEL built an earth station for satellite communications at Longovilo, near Santiago. Dedicated in July 1968, it was the first such station to be constructed in Latin America.

"It was far easier and less costly to project Chile into the mainstream of world communications than it was to electrify the country," Mr. Astrain

says. "At an investment of about \$6.5 million, it cost less to buy an earth station than a single Boeing 707 airliner, and the cost of a station is even lower today."

With Chile's satellite communications experience behind him, Mr. Astrain was more convinced than ever that the satellite had great potential for the advancement of the developing countries, and he dedicated his efforts to exploiting this new technology.

In 1968, his government sent him to Vienna as its representative to the United Nations Conference on Peaceful Uses of Outer Space. The following year he was sent to Washington

as Chile's representative to the Plenipotentiary Conference on Definitive Arrangements for INTELSAT. This was to be a pivotal assignment in his career. Here he teamed with the Australian and Belgian delegates in proposing a four-tier structure for INTELSAT. The proposed structure, which included a Meeting of Signatories and an Assembly of Parties, was designed to assure that all participating telecommunications entities, regardless of size, would have a forum in which to voice their opinions. This concept served as the basis for INTELSAT's present organizational structure.

The second session of the INTELSAT Plenipotentiary Conference, in 1970, appeared to be hopelessly deadlocked on a wide range of issues, such as management arrangements, powers and interrelationships of the various INTELSAT organs and the types of services INTELSAT should provide. At the eleventh hour, however, the delegations of Australia and Japan submitted a compromise draft agreement, one element of which was the four-tier governing structure proposal, and



*Leonard H. Marks of the United States, right, and Mr. Astrain approach the Plenipotentiary Conference on INTELSAT Definitive Arrangements with a great deal of confidence. The Conference was held in Washington in February 1969.*



*Santiago Astrain, right, at the opening of the first meeting of the Meeting of Signatories in Washington, in November 1973, shortly after his appointment as Secretary General of INTELSAT.*

the Conference decided that there was then sufficient basis on which to continue the negotiations. It appointed an Intersessional Working Group (IWG), of which Mr. Astrain was named Chairman, to draw up a draft agreement to be presented within one year to the membership for consideration—and ratification.

#### **Chairs IWG Meetings**

The year that followed was hectic. The IWG met in three sessions for a total of 125 meetings, with Mr. Astrain chairing 123 of those meetings. Despite the work of the IWG, the third session of the Plenipotentiary Conference involved intensive negotiations. But on May 21, 1971, accord was finally reached by the entire membership on a draft agreement and, on August 20, 1971, the Definitive Agreements were opened for signature. The signatures of two-thirds of the membership needed for ratification were obtained by December 1972, and the Definitive Agreements entered into force on February 12, 1973.

As the Plenipotentiary Conference prepared to meet for its third and

final session in 1971, Mr. Astrain returned to the kind of work in which he had first made his mark. He joined the International Bank for Reconstruction and Development (World Bank), where he was well known for his work with ENDESA and ENTEL. He served as Chief of the Power Section for Latin America and the Caribbean until, near the end of his third year with the Bank, he received a call from INTELSAT. After an extensive search to find the right man for carrying out the initial phase of the restructuring of INTELSAT, the Board of Governors had chosen him as Secretary General.

Among the key tasks that confronted him when he took office, two of the most significant were the establishment of the Executive Organ and the implementation of the Management Services Contract, under which COMSAT would perform technical and operational functions for INTELSAT. Now, three years later, with those tasks behind him, Santiago Astrain looks forward to the challenges of being INTELSAT's first Director General. Once again, he will have a large role in determining INTELSAT's future.

W. A. Geddes of Great Britain, Vice Chairman of the INTELSAT Board of Governors, greets Mr. and Mrs. Astrain, right, at INTELSAT's Tenth Anniversary reception in August 1974 as J. Alegrett of Venezuela, Chairman of the Board of Governors, and his wife look on.



Abbott M. Washburn, Commissioner of the Federal Communications Commission, and Mr. Astrain listen to speakers at the reception on the occasion of INTELSAT's Tenth Anniversary.

Michael Collins, Director of the Smithsonian National Air and Space Museum, and Mr. Astrain, Secretary General of INTELSAT, sign agreement in August 1975 for the loan of three communications satellites to the Museum.



**Authors' note:** *The MARISAT System, developed by COMSAT GENERAL, has opened a new era in maritime communications. Its success has been accompanied by considerable study as to the long-term provision of global maritime services. In this connection, two international agreements have recently been completed pursuant to which the International Maritime Satellite Organization (INMARSAT) would be created to provide global service. Plans for U.S. participation in INMARSAT are of particular importance to COMSAT since the White House Office of Telecommunications Policy (OTP) has indicated its intention to propose legislation concerning the designation of the U.S. entity to represent the U.S. in INMARSAT.*

THOMAS M. ZIMMER AND C. WENDELL BERGERE, JR.

**O**N SEPTEMBER 3, 1976, two international agreements were opened for signature which would establish a new international organization, similar to INTELSAT, to provide the space segment for global maritime satellite communications. The agreements are to enter into force after countries representing 95 percent of the initial subscribed investment shares have become parties to the agreements, with a limitation that this must take place by September 2, 1979. When the organization comes into being, it will be known as the International Maritime Satellite Organization (INMARSAT) and is expected to be headquartered in London.

With the success of communications satellites over the last decade and the success of INTELSAT as a vehicle for establishing a global communications satellite system, there has been increasing interest in extending the benefits of satellite communications to an ever broader group of potential users. One of the major markets for expansion of satellite services has been the maritime industry. Satellite communications are particularly attractive for reaching vessels at sea since other means of communication have inherent technical limitations, due in part to the great distances involved and to the mobile nature of the communications services, which preclude assurance of the high reliability essential to the maritime industry.

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*Mr. Zimmer is Assistant General Counsel for COMSAT General.*

*Mr. Bergere is an international attorney for COMSAT.*

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### Long-Term Service

Significant progress has already been achieved in bringing to reality maritime satellite communications with the commencement of service on the MARISAT system, and there are plans for the development by the European Space Agency (ESA) of its MAROTS system. However, the question of the most appropriate approach to the long term provision of global maritime satellite communications services has proven more time consuming.

Several years ago the Intergovernmental Maritime Consultative Organization (IMCO) became actively interested in the potential improvements that might be obtained, through maritime satellites, for safety of life and property at sea and for efficiency of navigation and shipping. In 1972 IMCO established a Panel of Experts on Maritime Satellites (POE) which was given the task of studying technical/operational, financial/economic and institutional matters relating to the establishment of a maritime satellite system. The POE also was instructed to prepare a report of its work should an international conference be convened to consider the question of the establishment of an international maritime satellite system.

### Work of the POE

Between 1972 and late 1974, the POE held six meetings and devoted considerable effort to defining operational requirements and technical parameters for an international maritime satellite system, making a financial and economic assessment of such

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a system, and developing proposed institutional arrangements.

While the U.S. participated in the work of the POE from its inception, it was not totally satisfied with the results of the work or with a number of the conclusions and recommendations contained in the POE's report. The U.S. had particular concern with respect to the proposed institutional arrangements, which did not envision a participating role for the private communications industry.

### **The International Conference**

Following the completion by the POE of its work, it was decided to convene an international conference under the auspices of IMCO on the establishment of an international maritime satellite system. The First Plenary Conference met in London in April 1975 and reached agreement that "there was a need for a worldwide maritime satellite system and also that there was a need for an international intergovernmental organization to administer and manage this system." However, there was a wide split in the Conference between those States advocating that governments should assume full responsibility for participation in such a system, including financial, technical and operational responsibilities, and those States which advocated that governments should be able to designate private entities to carry out such responsibilities.

### **Matters to be Resolved**

This controversy was a matter of crucial importance to the U.S. and the private communications industry since U.S. policy traditionally left to the private sector the provision of commercial communications services. On the other hand, those States advocating ultimate governmental responsibility for all matters, of which the Soviet Union was the leading proponent, believed that communications services for safety of life at sea were so important as to require governmental participation and responsibility. A related issue was whether the legal mechanism to establish an INMARSAT Organization should be through one agreement to be signed by governments or, as in the case of

INTELSAT, an intergovernmental agreement to be signed by governments and an operating agreement to be signed either by governments or by operating entities designated by governments.

Three other major issues which surfaced during the first session of the Conference were: (1) the distribution of powers between an Assembly of Parties composed of governments, each with an equal vote, and a Council composed of governments or operating entities with voting based on respective investment shares; (2) the extent to which the procurement policy of INMARSAT would require the Council to take steps to encourage and maintain competition in the provision of hardware through the dissemination of contracts internationally; and (3) the determination of the initial and long-term investment shares of countries participating in INMARSAT.

The resolution of these and other issues has been accomplished over the past year and a half by three inter-sessional working groups, a number of informal meetings among the largest anticipated potential investors in INMARSAT and two additional plenary sessions of the Conference.

### **Role of Private Enterprise**

With respect to participation in the organization by private communications entities, a contingent of European countries led by the United Kingdom agreed to accommodate the U.S. requirements and to implement this arrangement through the conclusion of two agreements, an intergovernmental Convention and an Operating Agreement. A distribution of powers was recommended between the Assembly and the Council which essentially would vest managerial and policy-making authority with respect to financial, operational and technical matters in the Council, reserving to the Assembly certain functions of particular interest to governments. A procurement policy was prepared which is very similar to that in the INTELSAT Agreement and which gives due recognition to the element of price, quality and most favorable delivery time.

### **Investment Shares**

One of the most interesting and difficult problems for the Conference

was reaching agreement on how investment shares would be determined. Although there was general agreement at the Second Plenary Conference held in London in February 1976 that actual utilization of the space segment would be the fundamental basis, a number of different approaches to counting traffic were suggested, ranging from allocating all traffic to the land station involved to allocating the traffic to either the land station or the shipboard station, depending upon which initiated the communication.

The compromise formula which was worked out allocated all traffic to both earth and shipboard stations where traffic originates and terminates, but even this solution had inherent in it a special problem. Under this formula some countries, such as Liberia and Panama, would be attributed a large utilization, with a consequential large investment share, since large numbers of ships are registered under their jurisdiction. Their difficulty arises because the true owners of these fleets are not citizens of, or otherwise involved in, these countries. As such, under the utilization formula, these "flags of convenience" countries would be faced with a far larger financial obligation to the organization than they would be prepared to assume. Thus, the Conference developed a solution permitting such a country, at its option, to reduce its investment share and thereby reduce the financial commitment it might otherwise have to make.

### **Voting Power**

Another very troublesome issue for the Conference was whether to impose an arbitrary limit on the voting power in the Council of a Signatory with a large investment share. There was considerable concern that a single Signatory, quite possibly the U.S., might be in a position to block decisions desired by a substantial majority of the organization. The U.S. asserted that as a matter of equity the principle of voting power equaling investment should be maintained. However, in the interests of achieving agreement, the U.S. was prepared to accept some reasonable limit on voting.

*(Continued on page 13)*

# INTELSAT Board authorizes award of INTELSAT V contract

The Twenty-third Meeting of the INTELSAT Board of Governors was held in September at INTELSAT Headquarters in Washington, D.C., solely to consider the INTELSAT V program. The Board:

- Authorized the Management Services Contractor to execute the proposed contract with Aeronutronic Ford Corporation for the procurement of seven INTELSAT V spacecraft. The total contract price including incentives is \$235,468,000.

**(Editor's note: Subsequent to the meeting, the contract was awarded to Aeronutronic Ford. An in-depth feature on the INTELSAT V satellite series will be presented in the November/December issue of PATHWAYS.)**

- Approved for planning purposes the following space segment configurations:

In the Atlantic Region, three INTELSAT IV-A's will be used as a Primary, Major Path and an Operational Spare in the period 1977-1979, and for 1979-1982 two INTELSAT V's will be used as a Primary and Spare and two IV-A's will be used as the Major Path and Operational Spare.

The Indian Ocean Region will have a Primary plus Spare configuration composed, during the period of 1978 through 1980, of two INTELSAT IV-A's, and from 1980-1982 of two INTELSAT V's.

In the Pacific Ocean Region two INTELSAT IV's will be used as the Primary and Spare for the useful lifetime of these satellites (forecast to be until 1981), and will be replaced by INTELSAT IV-A's that will be relocated from the Indian Ocean Region for the period 1981-1985.

- Authorized the Management Services Contractor to initiate negotiations with NASA on an INTELSAT V launch services agreement, based upon: four Atlas-Centaur and three STS (Space Transportation System) launches, with provision for up to eight optional STS launches; a reduction in the \$37.6 million charge

for use of the Atlas-Centaur prior to the use of the STS; and a clear definition of all aspects of the fixed price contract for the STS.

- Instructed the Management Services Contractor to limit further financial commitment to NASA on long lead items to four Atlas-Centaur launch vehicles.

- Authorized the Management Services Contractor to continue to

explore with the European Space Agency the technical compatibility, schedule, and definitive charge for the Ariane launch vehicle for possible use on INTELSAT V launches. The Management Services Contractor will report at future meetings on the progress in these areas.

- Approved a report to the Second Assembly of Parties (Kenya 27 September—1 October) reflecting the above decisions.

The Twenty-fourth Meeting of the Board of Governors was scheduled to be held at INTELSAT Headquarters in Washington, D.C. beginning October 27.

## Multi-million-dollar INTELSAT V contract awarded Aeronutronic Ford

In one of the most significant and far-reaching actions taken since its inception, INTELSAT has awarded a contract for almost a quarter of a billion dollars to the Aeronutronic Ford Corporation for seven INTELSAT V spacecraft along with supporting equipment and services.

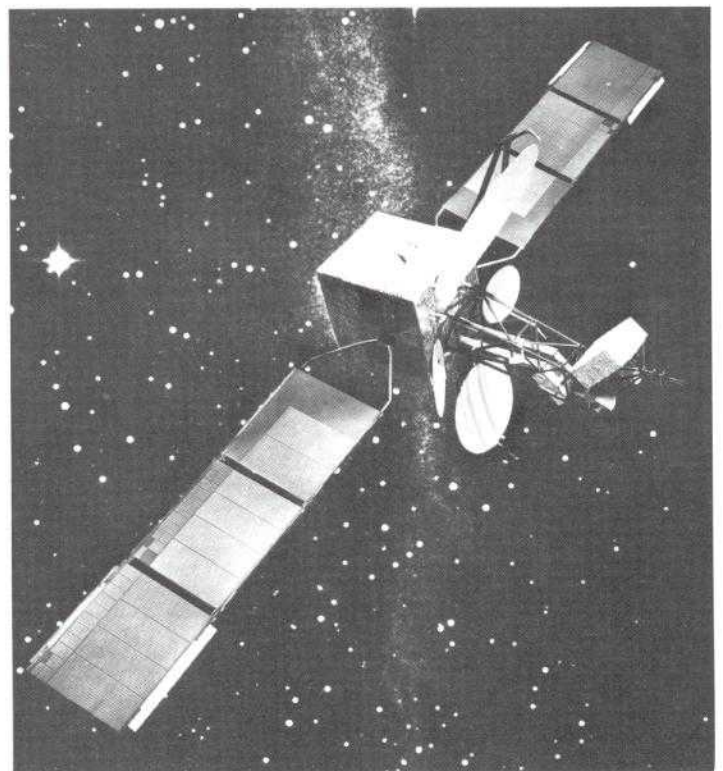
Estimated by INTELSAT to involve a financial commitment of nearly a half-billion dollars when launch costs are included, the new satellite program, the INTELSAT V series, will uti-

lize numerous advanced and innovative technologies and will serve as the mainstay of the global communications satellite system for the 1980's.

The program with Aeronutronic Ford will be monitored for INTELSAT by COMSAT as Management Services Contractor.

At its recently concluded twenty-third meeting, the Board of Governors of INTELSAT authorized the award of a \$235.5 million (U.S.) contract for

*Photo of a model of the INTELSAT V communications satellite*



COURTESY OF  
AERONAUTRONICS FORD

## SBS asks FCC to expedite domestic system applications

seven flight spacecraft, along with supporting equipment and services, to the Aeronutronic Ford Corporation, Western Development Laboratories Division, Palo Alto, California. The combined spacecraft procurement, launch services and capitalized management expenses are estimated to total some \$470 million. Aeronutronic Ford was selected from a field of competitors, which included Hughes Aircraft Company, Lockheed Missiles and Space Company, and TRW Systems, on the basis of technical suitability and price.

The contract calls for Aeronutronic Ford to deliver the first spacecraft within 33 months of the effective date of the contract; the second within 36 months; and the remaining five at four-month intervals. In the event of late deliveries, Aeronutronic Ford could suffer price reductions up to a total of \$8.1 million.

Under the terms of the contract, Aeronutronic Ford would be paid a total of \$176.7 million for the delivery of the spacecraft and other items, in accordance with a partial payment plan based on selected program "milestones." The remaining \$58.8 million will be paid in the form of incentives to be earned through the satisfactory in-orbit performance of each satellite over the duration of its seven-year design lifetime. In lieu of the in-orbit incentives, lesser amounts would be paid in the event of a launch vehicle failure or a need to store a spacecraft on the ground.

As provided in the contract, Aeronutronic Ford would award some \$54.6 million in international subcontracts. Firms scheduled to receive subcontract awards from Aeronutronic Ford are: The Marconi Company Limited (U.K.); Messerschmitt-Bolkow-Blohm (MBB), (Germany); Mitsubishi Electric Corporation (Japan); Selenia (Italy); Societe Nationale des Industries Aeronautiques (S.N.I.A.S.), (France); and Thomson-CSF (France).

INTELSAT, in addition, would have the right to purchase up to eight additional spacecraft and certain items of supporting equipment and services within five years of the effective date of the contract.

Satellite Business Systems (SBS) asked the Federal Communications Commission (FCC) in August to approve its applications for a domestic satellite communications system without the extensive delay associated with an evidentiary hearing or other further proceedings by the FCC.

In filing a response to petitions before the FCC opposing its entry into the domestic satellite communications field, SBS emphasized that its system proposals had been fashioned to meet fully the broad domestic satellite policies established by the FCC, and with meticulous attention to the particular standards and conditions of the "balanced CML option" set forth in the Commission's CML decision of February 1975. Pursuant to the CML decision, subsidiaries of COMSAT GENERAL Corporation, IBM and Aetna Life Casualty formed the SBS partnership to proceed with the "balanced CML" entry option.

SBS reiterated that it has proposed a domestic satellite system that will, through the use of new system concepts and communications techniques, uniquely promote the public interest by serving important private network communications requirements and fostering a pro-competitive environment. SBS added that its systems applications were developed fully within the context of the FCC's efforts to infuse competition into the provision of specialized or private line communications services.

SBS said that its applications already provide copious detail which equals or exceeds the quantity of information the FCC required in granting initial authorizations to the carriers already providing domestic satellite services. In addition, further particulars were provided in the SBS response to assure that the FCC has before it all of the relevant information necessary to support a finding that the grant of SBS's applications will advance the public interest.

An evidentiary hearing, such as SBS's opponents urge, would not yield additional information of a sub-

stantial or material nature, SBS said. Instead, such a hearing would increase the risks which SBS must already face in entering the field, and would effectively advance the carriers' private interests, by postponing, and perhaps aborting, the advent of a vigorous competitor. SBS also said that an evidentiary hearing would certainly frustrate the FCC's public interest goals and radically depart from the procedural standards which the Commission has adopted and applied consistently in the past with respect to domestic satellite applications for competitive services.

SBS also noted that, although the Department of Justice had joined the carriers in calling for an evidentiary hearing on antitrust questions, the Justice Department has not previously interposed objections to consortium arrangements such as SBS in the domestic satellite field which might be considered to have antitrust implications. Instead, the Justice Department has wisely encouraged the Commission to permit entry by any qualified applicant, and it has recognized the dampening effect which lengthy evidentiary hearings are likely to have. To insist upon a hearing to determine unascertainable future facts, SBS concluded, would be contrary to the public interest and to the goals of the antitrust laws.

SBS filed applications with the FCC in December 1975 for authority to construct a unique domestic satellite system, to operate at the higher 12/14 GHz frequencies, which will make available to customers their own all-digital, switched private communications networks and provide them with end-to-end voice, data and image services among small satellite earth stations located on their premises. A favorable decision by the FCC was requested by late 1976 so that the SBS system could begin operation in 1979.

A preoperational program, to begin in early 1977, is also proposed by SBS. In the first—or demonstration—phase, SBS and IBM would test



## Navy contracts for Indian Ocean service

The U.S. Navy has contracted for ultra-high frequency (UHF) communications service using a third MARISAT satellite in orbit over the Indian Ocean.

The MARISAT System, utilizing satellites stationed over the Atlantic and Pacific Oceans, is now providing high quality communications to the U.S. Navy and the commercial shipping and offshore industries.

The Navy began leasing full UHF service through the Atlantic MARISAT satellite in March 1976, and the Pacific satellite in June 1976.

Under the new arrangements, the Navy will increase its use of communications by MARISAT by leasing UHF capacity in a third MARISAT spacecraft, originally designated as a ground spare, to be deployed over the Indian Ocean. The satellite also will serve as a spare in orbit, and could be repositioned in the event of a failure in either the Atlantic or

Pacific satellite.

Lease payments by the Navy for full UHF service via the Atlantic and Pacific satellites, which remain the same under the new arrangements, amount to \$23.26 million per year. Lease payments for the new Indian Ocean service will be an additional \$6.5 million per year.

Under the earlier arrangements, the Navy agreed to two years of service via the Atlantic and Pacific satellites, with options for additional years. Under the new arrangements, the Navy agreed to lease service via the Atlantic and Pacific satellites until March 31, 1979, and via the new Indian Ocean satellite for two and one-half years after commencement of service in that region, scheduled to begin January 1, 1977.

Options permit the Navy to extend the term of service via all three satellites if it decides later to do so.

In joint applications filed with the

FCC, the MARISAT System owners said the launch date for the third MARISAT satellite had been scheduled for October 14, and subject to FCC authorization, intended to place the satellite in geostationary orbit 22,240 miles above the Indian Ocean at 73 degrees East Longitude.

Each of the multi-frequency MARISAT satellites has a design life of five years. The UHF portion of each satellite includes one wideband (500 kHz) channel and two narrowband (25 kHz) channels. The Navy leases the UHF capacity for fleet communications between its own fixed and mobile terminals.

The MARISAT satellites also contain capacity at L- and C-band frequencies for commercial maritime users. Modern, high quality telex, telephone, data and facsimile communications presently are being provided to commercial ships and offshore facilities via the Atlantic and Pacific satellites.

techniques for the innovative, all-digital service. The tests would be conducted with SBS antennas at IBM facilities in Poughkeepsie, N.Y., and Los Gatos, California, and through satellite capacity leased from an existing authorized domestic satellite carrier at 4 and 6 GHz.

After about six months, antennas would be installed at several other IBM domestic locations for the second phase of the preoperational program, which would be a common carrier service among a number of IBM locations.

SBS has awarded a contract, valued at about \$1 million, to Comtech Laboratories, Smithtown, N.Y., for the manufacture of two antennas and their installation by the end of this year at Poughkeepsie and Los Gatos. So that site preparation could begin this fall, SBS asked for a waiver of the usual FCC construction permit requirement. The FCC granted the waiver on September 20 and site preparation began shortly afterward.

The FCC said that its action in no way prejudices or predetermines later action on the SBS applications themselves.

## Aeronautical satellite contract negotiations authorized by AEROSAT Space Segment Board

The AEROSAT Space Segment Board, consisting of representatives of the European Space Agency, COMSAT GENERAL and the Government of Canada, has authorized its Space Segment Program Office to initiate contract negotiations with General Electric for the construction of two satellites for use in an experimental aeronautical communications program.

At its September meeting held in Frascati, Italy, the Space Segment Board reviewed the results of the evaluation of proposals submitted by General Electric, RCA and TRW. The Board noted that each of the proposals was of commendably high technical standard but that the proposal submitted by GE was significantly below the quotations of the other two proposers.

The AEROSAT Program is designed to provide an experimental system of satellite communications between transoceanic aircraft and the ground.

The Program is being carried out within the framework of a Memorandum of Understanding signed by the European Space Agency (ESA), the U.S. Federal Aviation Administration (FAA) and the Government of Canada.

The Program is divided into two parts: the Space Segment includes the development, production, launching and seven-year operation of two satellites; the Co-ordinated Segment includes aeronautical satellite communication centers, aeronautical services and earth terminals and avionics.

Launched into geostationary orbits by Delta vehicles, the two satellites will be spaced 25 degrees apart over the Atlantic Ocean. The first launch is scheduled to take place before the end of 1979 with the second approximately eight months later. The satellites have a design life of seven years.

## Briskman on organizing committee for world technical congress in Moscow

Robert D. Briskman, Assistant Vice President, Fixed Systems, COMSAT GENERAL, is one of the two American scientist-members of the Organizing Committee of the World Electrotechnical Congress to be held in Moscow in June 1977.

More than 4,000 scientists and engineers from many countries are expected to take part in the presentations of the Congress and in organized discussions with scientists from different countries representing diverse scientific schools.

The Congress is being sponsored and organized by the Ministry for Electrical Engineering Industries of the U.S.S.R. and the Academy of Sciences of the U.S.S.R. with the endorsement of the International Electrotechnical Commission.

With the theme "Present and Future of Electrotechnical Engineering,"



Robert D. Briskman

the program will emphasize current and evolving challenges in the development of electrotechnology and elec-

tronics. Subjects will include construction of electric equipment for thermoelectric plants, utilization of superconductivity for generators and transmission lines, the application of new methods of energy conversion and the application of electronics in various branches of science and technology.

In addition to technical visits during the Congress, to include the International Specialized Electrotechnical Exhibition, "Electro 77," held in Moscow, participants will have post-Congress tours available to the Caucasus, the Black Sea Coast, the Baltic Sea Coast, Siberia and the Central Asia Republics.

Serving on the Organizing Committee with Briskman are leading scientific figures from Australia, Czechoslovakia, France, Germany, Great Britain, Japan, Sweden, the United States and the U.S.S.R.

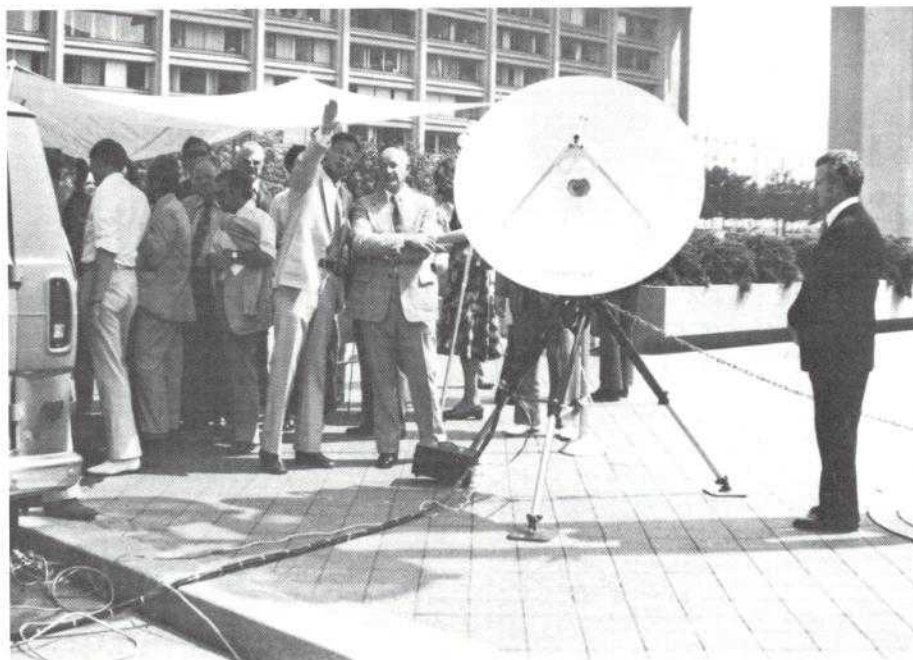
## USIA cites PATHWAYS Bicentennial wrap-up

The office of Public Information is in receipt of a letter of appreciation from the United States Information Agency for the Bicentennial feature carried in the July-August issue of PATHWAYS in which the Agency's efforts to carry the Bicentennial message worldwide were emphasized as part of the total story.

In a letter to PATHWAYS Editor John J. Peterson, Elaine M. McDevitt, Liaison Officer, Motion Picture and Television Service, USIA, said: "Your thoughtfulness in sending copies of your fine story on USIA's 'Salute by Satellite' is much appreciated. We have passed along the article to those of our staff who were involved in the project.

"So often our media efforts, directed as they are to an overseas audience, go unnoticed by our colleagues here in the U.S., and your generous praise in the occasion of this major Bicentennial program is most welcome."

## Disaster relief experiment



As part of the early preparation for the COMSAT-Red Cross disaster relief experiment, a four-foot antenna is set up outside Corporate Headquarters at L'Enfant Plaza to demonstrate the technical feasibility of communicating over Canada's GTS. Louis B. Early of the Labs points out the narrow clearance between buildings available to experimenters in transmitting to the GTS to COMSAT President Joseph V. Charyk.

**I**N COOPERATION with the National Merit Scholarship Corporation, COMSAT is again sponsoring a four-year college scholarship for an employee's child who will be eligible to enter college in 1978.

The NMSC is an independent, non-profit organization established to discover the Nation's ablest young people and to aid them in obtaining a college education with the support of business enterprises and other organizations through scholarship grants.

COMSAT Scholars are chosen by NMSC on the basis of scholastic aptitude, leadership and good citizenship as determined by testing and other procedures established by the Corporation. Corporation officers and employees are excluded from participating in any part in the selection of COMSAT Scholars.

All children, natural or legally adopted, of regular COMSAT employees and its subsidiaries, are eligible to

## COMSAT continues sponsorship of four-year college scholarship

compete for this scholarship including children of retired and deceased company employees. An employee's child who is presently a high school junior and will complete his or her senior year in 1978 and enter college in September 1978 is eligible to compete for the COMSAT scholarship.

Scholarships are four-year awards to cover the undergraduate years. Stipends depend on family financial circumstances and the cost of attending the college selected and are usually based on the difference between the "X" dollars available to the student and the cost of attending a particular college.

COMSAT stipends will vary with the individual case between \$250 per year,

the minimum amount in cases where no financial help is believed necessary, to an upper limit of \$1,500 a year.

NMSC will conduct all phases of the competition including the selection of scholars, the determination of stipend amounts and the administration of scholarships in force. Candidates and their parents should address inquiries to William B. Lockett, Assistant Director of Personnel, EEO and Human Resources Development, Room 7151, COMSAT Building.

Winners should direct their questions to the National Merit Scholarship Corporation, 990 Grove Street, Evanston, Illinois 60201.

### INMARSAT

*(Continued from page 8)*

Agreement was reached during the interim period before the Third Plenary Conference in September 1976 on a 25 percent voting limitation. In return, it was also agreed that a Signatory affected by the limitation could divest itself of any excess investment and, to the extent such excess investment was not accepted by other Signatories, it would be retained by that Signatory and the commensurate voting percentage would also be retained.

#### The U.S. Entity

With the acceptance by the Conference of the U.S. position to allow participation in INMARSAT by private communications entities, a U.S. domestic question arose concerning the entity to be designated as the U.S. Signatory to the organization and how the designation would be accomplished.

The FCC has issued two Notices of Inquiries on the subject of maritime satellite services, including the desig-

nated entity issue, and the Office of Telecommunications Policy (OTP) has sought intragovernmental advice as to the most appropriate solution. There has been no resolution of this matter, although earlier this year OTP proposed new legislation which would, if enacted, designate a new subsidiary of COMSAT as the U.S. Signatory to INMARSAT and would allow COMSAT to market maritime satellite services to the public in competition with the other carriers. A draft of the legislation was circulated within the government by the Office of Management and Budget, and among interested private parties by OTP.

#### The Preparatory Committee

An important resolution adopted by the INMARSAT Conference was that during the period before the agreements enter into force, a Preparatory Committee is to be established to take preliminary steps with respect to defining the type of space segment facilities to be established by IN-

MARSAT, the kind of services (*e.g.*, voice, telex, data, safety and radio determination) to be provided and the initial structuring of the organizational arrangements.

The Preparatory Committee will have its first meeting January 10-14, 1977, assuming that at least 14 countries sign the INMARSAT agreements or indicate their intention to commence the necessary actions to join the organization. The Committee's work will be financed by equal contributions from each of its members, with an annual ceiling on its spending of \$500,000 and a total ceiling of \$2 million, unless unanimously agreed otherwise.

Great strides have been made in efforts to create a single global maritime satellite communications system. When INMARSAT does start operating its system, international cooperative efforts for improving global communications will have added another accomplished milestone to the promise of communications satellite technology.

## Safety is good business

Every company whose business "affects commerce" is subject to the federal Occupational Safety and Health Act (OSHA) of 1970. A business "affects commerce" if any of the tools, equipment, materials, or devices used in it were manufactured in another state. This means that virtually every employer in every industry is covered, which includes some five million employers and 60 million workers.

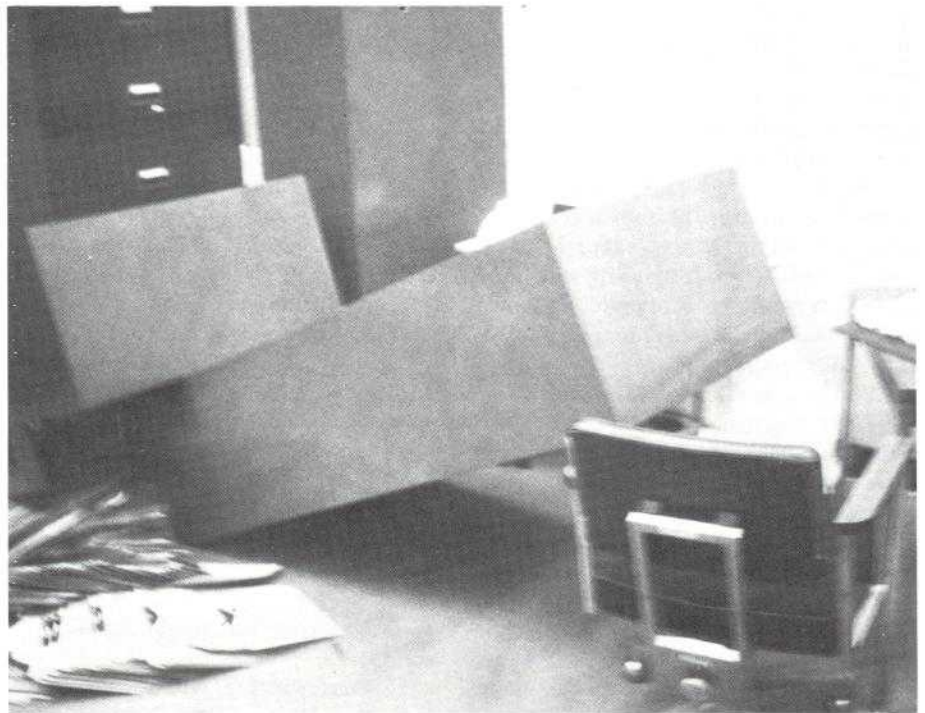
The OSHA established two responsibilities for employers. First, it required that they provide employment and places of employment free from recognized hazards and, secondly, that they comply with safety and health standards published by the U.S. Department of Labor.

Employees also have responsibilities under the OSHA. They must comply with all of the rules, regulations, and standards applicable to their actions and conduct.

In the past, some companies did not show the proper concern for safety and health matters, and are now still slow in setting standards that could make their operations much safer and more profitable. They fail to recognize the potential return and the profit protection that a good accident prevention program provides. Consequently, employees develop work habits which compensate for hazardous situations that face them on the job. This in turn adds up to significant hidden operating costs.

The question is then asked if a worker wouldn't be more productive if these conditions did not exist and he did not have to compensate for them in addition to doing his normally required job? The answer is, of course, obvious.

When hazardous or unsafe conditions are not compensated for by the employee and an injury results, the more visible costs to employers then



*Although a bit out of focus, the picture above illustrates the point that accidents happen anywhere and when least expected. In this instance the employee was struck but fortunately not seriously hurt when some improperly filled filing cabinets unexpectedly toppled over, striking the chair in which she was sitting.*

become rapidly apparent. Workman's Compensation costs, lost time in the operations or research effort by all employees exposed to the accident, possible damage to machines, materials, and equipment, and other costs are easily computed.

The workers always lose when they are involved in an accident resulting in injury. There is just no way they can be compensated completely for their losses. Although Workman's Compensation Insurance takes care of the direct costs (mainly medical costs and lost wages), serious and permanently disabling cases are another matter. In addition to the visible costs, there are other factors which can never be properly compensated for: pain and stress on family and friends; loss of skills or abilities to continue a trade or a career; disruption of family, social, economic, and other patterns; changes in life styles, goals, and objectives of the injured and his family; and a whole new life pattern for the family in fatal cases.

Before the OSHA, there was no single national safety and health code for employers to be measured against.

Now there is, and it establishes a national standard of conduct for safety and health risks. Companies are no longer accept safety and health risks, on the job or elsewhere, which other generations considered "unavoidable." The acceptability of risk must be resolved in the context of rapidly changing value systems. The community image of a firm that is "a good neighbor and a safe place to work" is a major asset.

When a high degree of safety is incorporated into the design of the equipment or the planning of the new or existing process, the need for training and supervision to control unsafe acts is reduced but not eliminated. The most effective times to keep hazards out of the plant, process, or job are: prior to building or remodeling; while a product is being designed; before a change is put into effect; or before a job is started. Every effort, therefore, should be made to find and remove potential hazards at the design or planning stage. The Safety Office is available to help provide this support.

In most accidents, both an unsafe

BY MEL WILLIAMS



## NOTES FROM PERSONNEL

### COMSAT actively involved in area Junior Achievement Program

COMSAT and other business organizations in the metropolitan Washington area are now actively involved as counseling firms in the 1976-77 Junior Achievement (J.A.) Program Year. J.A. is an international business education program in which high school students organize and manage their own "small-scale" companies under the guidance of adult advisers provided by the counseling firms. In the U.S. alone, over 50,000 business people contributed their time to J.A. and over 90,000 firms and individuals provide funds. J.A. provides young people the opportunity to develop their personal abilities and economic understanding through actual experience. It enables them to learn first-hand how a business operates, and to evaluate various careers.

A J.A. company is organized by bringing together 15 to 20 students who choose a product to manufacture, a company name and officers of the company. Over the past eleven years more than 8,000 teenagers have participated in the J.A. Program in the metropolitan Washington area. Teenagers participating in these com-

panies (from 13 companies in 1965 to 60 companies in 1975) have been given a chance to see the free enterprise system at work. This year there will be approximately 80 J.A. companies attempting to reach over 1,500 area teenagers.

An adviser team from COMSAT, consisting of June Burton, Johann Curtin, Richard Keefer, and Mel Williams will counsel two J.A. companies this year. The team will select a "starter product" (something easily made to sell for a few dollars) until the Achievers decide on a final product, or decide to continue with the starter product. The Advisers also have the responsibility of training the officers of the company and serving as management consultants throughout the program year.

As the program year closes, the J.A. company is liquidated, giving the students an opportunity to see the whole process of how businesses function, from beginning to end.

### Thrift and Savings Plan withdrawal period in November

One of the principal features of the Thrift and Savings Plan permits a "periodic partial distribution";

that is, a withdrawal without penalty, while you are still employed. During November, participants who were in the Plan during 1973 may elect to receive, during February 1977, a distribution of the value of their contributions as well as of the Corporation's contributions for the year 1973, both valued as of December 31, 1976. If this option is not exercised, the value of the contributions listed above will remain in the Plan until: (1) retirement; (2) termination of employment; or (3) a withdrawal via the standard withdrawal options described in section 9 of the Plan.

To assist you in making your decision whether or not to exercise this option, a statement setting forth the value of your 1973 accounts as of September 30, 1976, together with the amount of your 1973 contributions will be provided. Also, the statement will contain additional information regarding your Thrift and Savings account as of September 30, 1976.

Should you decide not to exercise this option during November for the value of the total 1973 contributions, the Trustee will continue these investments in the fund(s) you have elected. It is important to note, however, that the 1973 Corporate contributions become fully vested on December 31, 1976.

The periodic partial distribution election is made during November each year for the value of all contributions made during the fourth preceding year. If that election is not made those values remain invested in the appropriate fund(s) and in the future may only be withdrawn via the standard withdrawal options.

If you choose to exercise this option, you must obtain a Disbursement Form, CSC 845, from the Personnel Services Unit at the Plaza, the Personnel Office at the Labs, or from the Administrator at your location. The completed form must be returned to the Personnel Office at the Plaza by November 26, 1976.

condition and an unsafe act are contributing factors. Unsafe conditions often can lead employees to perform unsafe acts. For example, an unsafe act may be caused by poor machine design, inadequately planned methods, and other engineering deficiencies. Thus, elimination of a hazard caused by an unsafe condition is also reducing the likelihood of injury from an unsafe act.

The success of any safety and health program requires the cooperative effort of the supervisor and the individual employee. Each supervisor is responsible to assure safe working

conditions within his department and for directly implementing the Corporation's safety and health program.

Each employee, on the other hand, is responsible: to report any accident immediately to his supervisor; to notify his supervisor or the Safety Office immediately when certain conditions or practices may cause personal injury or illness or property damage; to observe all safety rules and to make maximum use of all prescribed personal protective equipment; and to follow practices and procedures established by the Corporation to maintain his health and safety.

## Wood and Lawler head 1976 United Way drive

COMSAT supplements contributions; offers vacation prize

COMSAT President Joseph V. Charyk kicked off COMSAT's 1976 United Way campaign on October 18 with an appeal to all COMSAT employees to contribute to this worthy community service.

The campaign will be short and intensive, running from October 18 to 29. All employees are urged to give prompt consideration to making the best commitment they can, as soon as possible.

Dr. Charyk appointed H. William Wood, Vice President, U.S. INTELSAT Division, as chairman of COMSAT's UW campaign, and George A. Lawler, Director of Marketing, as co-chairman.

In a message to employees Dr. Charyk said, "As you know, this is the only charitable solicitation of employees we authorize and support within the Corporation.

"The matching fund plan, established by the Corporation to provide

50 percent of the amount raised in excess of the previous year, will continue. Therefore, for every \$2 pledged by employees in excess of the \$29,200 raised last year, the Corporation pledges to increase its contribution to the United Way by \$1. As an added incentive, we will also give two additional days' vacation to an employee (to be selected by a random drawing) who contributes an amount equal to or greater than the minimum payroll deduction (\$1 per pay period or \$26) during the first week of the campaign.

"I believe the United Way of the National Capital Area serves a very important community need. This one well-coordinated, fund-raising campaign provides for 140 of the most vital and effective human care agencies in Arlington, Alexandria, Fairfax County, Falls Church, Prince William County, District of Columbia, and Montgomery and Prince Georges counties.

"A massive volunteer involvement, throughout the year, enables the United Way to hold its combined campaign and administrative costs to 10 percent, quite an accomplishment in comparison to statistics revealed about the fund-raising of other agencies.

"Your contribution helps in hundreds of different ways each day of the year. The services funded by the United Way cannot continue unless all of us take an active interest and give our fair share of support. Won't you please take just a few minutes of your time and turn in your pledge card for your contribution as soon as possible."

Mr. Lawler pulled together his team captains early in October, and employees were expected to be contacted by them promptly. The team captains are: Michelin Fleurant, Executive Office; Seymour Lynn, Engineering; Jorge Fuenzalida, Advanced Systems; Neil Helm, COMSAT Labs; Linda Whetzel, Procurement; Jack Rutter, COMSAT GENERAL; Dorothy Kozman, Corporate Affairs; Deborah Gilman, INTELSAT Management Division; and David H. Oliver, Finance.



Wanda Mills, secretary to George Lawler, assists Darleen Jones of M & S gather campaign material.



George A. Lawler and H. William Wood, standing left and center, Co-Chairmen of the corporation's United Way Drive, meet with U W workers as campaign gets underway.

# Tragedy strikes the Labs' "Duck" family

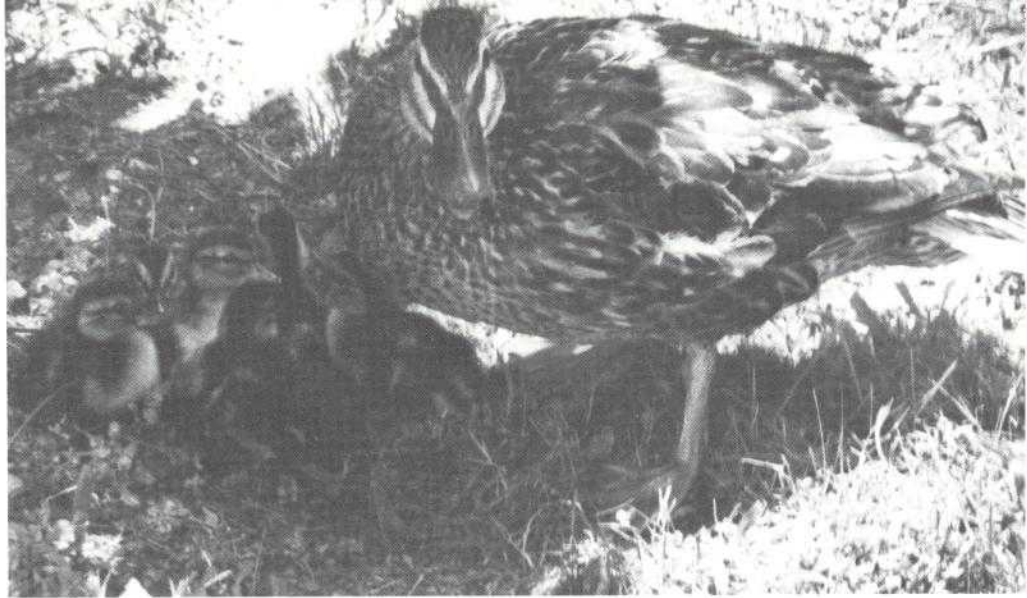
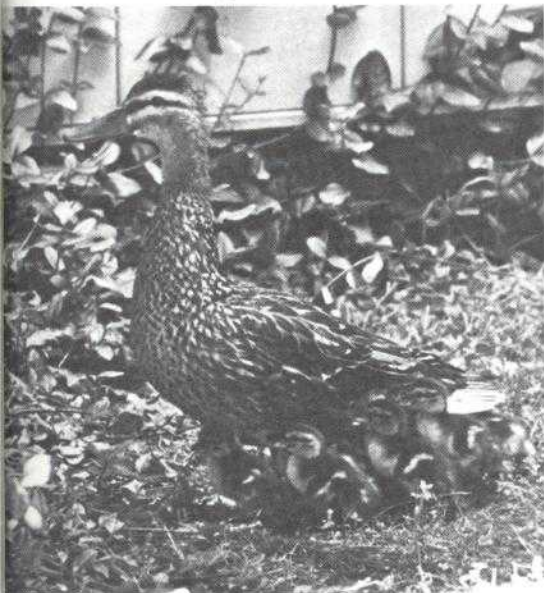
BY JEWEL MCCAA

"The Duck" might refer to any of a variety of species of ducks, but to faithful COMSAT Labs employees, there is just one "Duck": a delightful female version of the mallard, who recently presented us with a brood of "Ducklings."

It is doubtful whether the launch of any of our satellites could bring about more excitement than the hatching of eight out of ten duck eggs brought to the Labs. But our "Duck" wasn't on the launching pad, instead she had waddled (ducks do waddle) all the way from the pond (equipped with duck houses supporting COMSAT antennas) to the far side of the building, only to make her nest next to a concrete slab from an emergency exit door in one of the courtyards.

She was a very, very patient duck who willingly tolerated being given a pan of water (just because it was hot

*"Waddling" toward their new home.*



PHOTOS BY BILL MEGNA

*Watching over her brood.*

and she looked thirsty) and a pile of corn and wild bird seed that her neighbor, a chipmunk, stashed away for the winter. For about four weeks she sat, amid constantly watching eyes, leaving only long enough for an occasional stroll to the pond, but even then, only after taking the time to cover her nest so thoroughly that not an egg could be seen.

On Wednesday, August 4, her first egg had hatched by 12:30 p.m. and the watch began. By 4:45 p.m. (Labs' summer quitting time), five ducklings had been counted and more eggs were there. It was difficult to count them because she kept sitting on both the eggs and baby ducks. By Thursday morning eight ducklings were present. Apparently she knew the remaining two wouldn't hatch because she left the nest for a walk under the trees, followed by eight brown and yellow babies.

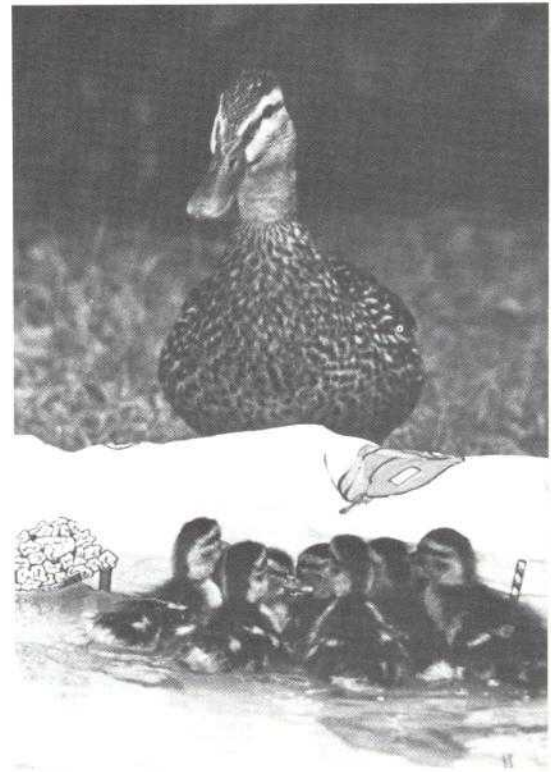
It was decided to move the mother and her brood to an enclosed area—all grass and trees—on the other side of the building from her nest, to keep them safe from the turtles in the pond and local foxes. A pan of water for drinking, some wild bird seed for "The Duck" and some chick-starter meal for the babies were provided. The problem of a pond was solved when an avid animal lover volunteered to buy a wading pool. The pool was filled with air and water, and a plank was added so they could walk in and

out of the pool. Our photographer was prevailed upon to take pictures of the happy family.

## Epilogue—Wednesday, August 11.

Only one baby duck remains. Some roaming cats were seen running away from a large meal of ducklings in spite of all the precautions to keep them safe. "The Duck" and her remaining duckling have been moved to the pond—maybe the little one will survive the turtles. The pool, water pans, etc. have all been put away. She just might try again next year.

*Trying out the water in their new pond.*



*Mrs. McCaa is in the Office of Development Applications at COMSAT Labs.*

## Network Bits

### Field Correspondents

#### Andover

*Joanne Witas*

#### Brewster

*Dorothy Buckingham*

#### Cayey

*John Gonzalez*

#### COMSAT General (Plaza)

*Jen Baldwin*

#### Etam

*Bev Conner*

#### Fucino

*Sandy Tull*

#### Jamesburg

*Warren Neu*

#### Labs

*Carol Van Der Weele*

#### M & S Center

*Darleen Jones*

#### New York

*Stephen Keller*

#### Paumalu

*Bob Kumasaka*

#### Plaza

*Gloria Lipfert*

#### Santa Paula

*Pat Hogan*

#### Southbury

*Eileen Jacobsen*

**ETAM.** Vacations are still underway at Etam: **Paul Mauzy** and family vacationed at Myrtle Beach, South Carolina; **Mike Britner** and family at Sea World and Cedar Point in Ohio and then back to Appalachia Lake in West Virginia; and **Carl Cooper** and family at Carolina Beach.

**Clifford Sigley**, Advance Industrial Security Janitor, has retired. The CEA held a little get-together in the Canteen for Cliff with cake and ice cream and, of course, a farewell gift of a weather instrument, featuring a barometer, hygrometer and thermometer. **Phyllis Loughrie**, who has served as part time janitor in Cliff's absence and also has been employed in the capacity of a guard, has been selected as Cliff's replacement.

It seems a few of the Etam employees have been besieged with a bit of bad luck: **David Cross** spent a few days in the Elkins Hospital for surgery but is back to work and as cheerful as ever; **Phyllis Loughrie**, our new full time janitor employed by Advance Industrial Security, is presently in the Broadus Hospital

in Philippi where she underwent surgery and is recuperating at present; and **Chet Randolph** is still off with a broken leg.

Turning to the brighter side, two of our fellow employees have been bestowed with some good luck. **Lenny Gifford** and **John Formella** have been purchasing Pennsylvania lottery tickets on the "buddy system," each paying half for the ticket. Their number was drawn and they were the winners of \$1,000. They are now purchasing Pennsylvania and Maryland lottery tickets in anticipation of another big win.

After a fruitless search around the Kingwood area for nearly a year, **Ron Feather**, Facilities Mechanic, finally discovered five acres of property that was just meant for him right outside of Kingwood and is now in the process of having a home built. **Bill Mayes**, a home owner in Grafton for several years, recently found another home in Grafton more suitable to his needs and is in the process of purchasing same.

**Bob Leard**, Operations Supervisor, retired in October, having been with COMSAT a little over 10 years. To help Bob celebrate the occasion, several of his co-workers and friends from AT&T and ITT got together for a dinner in his honor at Red Run Inn at Deep Creek Lake, Maryland, where they presented Bob and his wife, **Doris**, with coal statues of a coal miner and his wife and, of course, a bucket of coal to help remind them of West Virginia, fishing rods and reels, a tackle box and an ice chest to help them relax on their retirement.

**Leonard Gifford** has been promoted to Operations Supervisor of the Blue Team filling Bob's vacancy and **Bill Bell** has been transferred from the Electronic Maintenance Shop to the Gold Team, filling the position left vacant by Lenny's promotion.

The Annual Etam Horseshoe Tournament is under way again. Competition is hot and heavy! Eliminations are being held with **Marvin Miller** over **John Formella** (self proclaimed champ), **Mike O'Hara** over **Roger Parsons**, and **Bill Mayes** and **Don Gaston** each having won one game in a best out of three series. Requirements for individuals participating in this ser-

ies are: cool nerves, a steady hand, ability to maintain composure under pressure and a six-pack of quality beer. However, if the last requirement is met, then the others may be waived. The tournament champ will receive a six-pack donated by each of the other participants.

—Bev Conner

**JAMESBURG.** Several personnel changes have been made at our station over the past several months. **William O. Bricker**, recently retired from the U.S. Army having completed 27 years active duty, has joined our staff as Electronic Technician filling the vacancy created by the transfer of **John Castorina** to the Santa Paula Station. Bill is married and the father of two girls one of whom is with the Air Force Security Police stationed at Lackland Air Force Base in Texas.

**Joseph O. Speek**, one of our original employees, starting here in 1968 and since advancing to Operations Supervisor, recently spent six weeks on temporary duty in Saudi Arabia and finally accepted a transfer to COMSAT GENERAL with permanent station in Saudi Arabia. Station personnel gave Joe and his wife, **Chris**, a farewell party. Following a trip to Washington, the Speeks will spend a two-week vacation with Chris's family in Denmark, then, on to Saudi Arabia.

**John Pate**, Senior Technician, is leaving Jamesburg to accept a position with an organization involved in electronic design, John's forte. A graduate of the Monterey Peninsula College with an AS Degree in Electronics, he joined our staff in 1973 as a Technician, subsequently advanced to the position of Senior Technician and Electronic Maintenance Technician in the Electronics Maintenance Shop, and frequently performed the duties of Operations Supervisor. During his stay with us here at Jamesburg, John has contributed several suggestions which have added considerable to the efficient operation of the station.

—Warren Neu

**M&S CENTER.** A warm welcome to the three new members of the organization, **Jeffery Sedgwick**, **Charles Jenkins** and **Charles Andersen**. Congratulations are in order for



## Service awards presented



M & S Center employees receiving service awards from H. William Wood, Vice President, U.S. INTELSAT Division, are, left to right: Bud Kennedy, five years; Richard E. Eliason, ten years; Mr. Wood; Floyd W. Thompson, five years; and Ramon L. Hashberger, ten years.

**Carol Upole** on the birth of a grandson, to **Bob Riblet** on becoming a grandfather for the second time with the birth of a granddaughter, and to **Bill** and **Susie McGuire** on the birth of a daughter, **Amy Rebecca**.

Last summer vacation flings were enjoyed by **Dick Eliason** on a tent camping trip to Chincoteague, Virginia; **Mike Roberts** motored to North Carolina beach areas for a week of sun and surf; **Laird** and **Darleen Jones** packed the camper and headed for the beaches of Virginia and on to North Carolina and back through the mountains and Skyline Drive. **Patricia Ross** went to Andover, Maine, for a 10-day orientation during August. Site personnel were extremely helpful in providing information and explanations which made the trip very enjoyable as well as instructive. Thanks to **Don Fifield** for his cooperation.

—Darleen Jones

**PAUMALU.** For the past five months, from the opening of spring practice in April to the division and statewide championship series in mid-August, Little League baseball has dominated the weekend activities of many parents. Several Paumalu station employees were actively involved with the teams on which their youngsters played. **Stan Holt**, **Gil Estores**, **Joe Chow**, **Paul Koike**, and **Tamotsu Iwamoto** assisted the Little League program in their areas, serving as assistant coach, team mana-

ger, or as enthusiastic fans in the stands.

**Joe Chow**, Facilities Engineer, is a typical example. Joe served as the team manager of the *Wahiawa Indians* whose members were made up of 11- and 12-year old youngsters living in the Wahiawa community and among whom was his son Jay, age 11. The team won the area and division championships and advanced to the semi-finals of the Little League statewide tournament before being eliminated.

As team manager, Joe acted as nursemaid, equipment caretaker, financial coordinator, chauffeur, and, at times, peacemaker amongst over-enthusiastic parents. However, he considers the after-work hours during the long season worthwhile and very satisfying. As a footnote, Joe has admitted to his wife, **Marian**, that he's neglected the yard at home but that he'll get around to it during basketball season since he and his fellow Little Leaguers are presently involved in Pop Warner football.

In recent weeks, travelers on Highway 83 near the Paumalu Station have noticed the Paumalu-I antenna pointed in a southeasterly direction instead of its usual southwesterly direction. The reason for this is the role of Paumalu in providing backup service to GSAT's Sunset Station. Since the inauguration of Hawaiian service by GSAT in late July, traffic has been restored via the Paumalu-I antenna on several occasions due to problems with the GSAT antenna and

associated equipment. In addition, use of Paumalu-I was requested by GSAT for three days in early September to perform tests on the new COMSTAR D-2 satellite.

The annual summer picnic for station employees and their families was held in late August at the Hale Ohana Camp, a private beach camp located near the station. **Charlie Ogata** and members of Operations Team 3 planned and organized this year's picnic which attracted approximately 65 adults and children. Assisting Charlie were **Bill Osborn**, **Tamo Iwamoto**, **Paul Koike** and **Bill Romerhaus**. —Bob Kumasaka

**SOUTHBURY.** Congratulations to **M. C. "Bart" Bartlett**, Station Engineer, on his 10th Anniversary with COMSAT/COMSAT GENERAL as of September 1976. Southbury Earth Station welcomes three new employees: **G. S. "Scott" Ackland**, Technician; **Mrs. Rose Marie Eureka**, MARISAT communications operator; and **Michael R. Masse**, Technician.

Recently we were visited by Dr. K. Miya, of Kokusai Denshin Denwa Company, Ltd. (KDD), Tokyo, Japan, who is also editor of the book, *Satellite Communications Engineering*. Station Manager **Dave Durand** and family vacationed in New York State and took in the St. Lawrence Seaway during the latter part of August.

**Rich Vasko**, Technician, and **Bart Bartlett** went on a fishing trip in Bart's new jeep to the Connecticut Lakes, New Hampshire. **Connie Sarles**, operator, returned from her first four-day break. She visited New York City where she attended theaters, Lincoln Center, saw friends—and walked, walked, walked by all those gorgeous store windows.

Our resident artist, **Bart Bartlett**, just completed his latest painting which he presented to the MARISAT Operators. It is a water color landscape depicting the setting sun, done in muted shades of rusts, yellows and browns. There was a bumper crop this year from the earth station garden. **Connie Sarles** was giving away tomatoes by the dozen and we will be eating zucchini bread till Christmas (**Jim Nelson** said his dog loved it). **Roger Miner** bought a 1967 Volvo with at least 250,000 miles on it from **Dolores Raneri**, which he named

"blue lightning." More about it later . . . maybe! —**Eileen Jacobsen**

**PLAZA.** Relying heavily on hitting, the COMSAT *Comstars* carried through another good season finishing with a 10-2 record in the D.C. Department Recreation Women's Softball League. Losing twice to their nemesis, the *DeYoung Smokers*, was disappointing; however, the players felt the breaks made the difference in both games. In the single elimination playoffs the *Comstars* lost their first game in close contest with the *Sliders*, a tough way to end the season.

The CEA-sponsored *Comstars* included players **Harriet Biddle**, **Evelyn Braswell**, **Linda Kortbawi**, **Diana Pontti**, **Gail Ricci** and **Mabel Vandergriff**. Harriet and Mabel carried COMSAT through the season behind the plate keeping steals to a minimum. Evelyn started the season covering first base but later turned the position over to Gail who found her home (unfortunately, Gail has found another home in Texas and will not be returning to the *Comstars* next year). Linda played five different positions during the season and played each one well. Her continuous improvement as pitcher has placed her in the number one spot at that position. Diana played a steady outfield and led the team in batting with an .818 average.

The coaching staff did its usual excellent job this year. The staff included **Wayne Brown**, **Mike Jeffries** and **Ed Mikus**.

COMSAT will say farewell to **John** and **Shirley Hewitt** soon departing for California where John has accepted a position with Varian Associates. **Bill Brauer** retired after 10 years service turning over the demanding position of Manager, Satellite Control Operations, to **Lee Jondahl**. The Brauer family will take up residence in a new home at North Myrtle Beach, South Carolina, which, coincidentally, just happens to be next to a golf course.

**Bill Simms** of Finance has joined RCA and is moving to Alaska. **Pat Irby** has returned to work after her three-month camper trip across the country with her family. The Irbys took the Southern route, spending July in California and returning



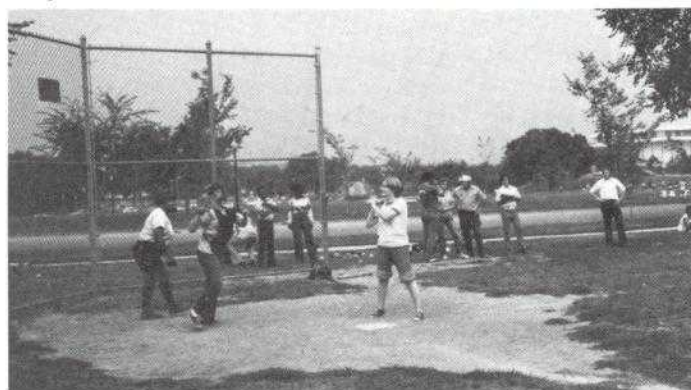
*Linda drives ball out of the picture— almost.*



*Gail nabs a foul.*



*Wayne sends runner to second.*



*Harriet collects a pop-up.*

home by way of Oregon and the northern states, having traveled more than 13,000 miles and visiting 30 states. Pat recommends this kind of a

trip and found especially enjoyable the outdoor activities available at Yellowstone and in the Grand Tetons.

—**Gloria Lipfert**

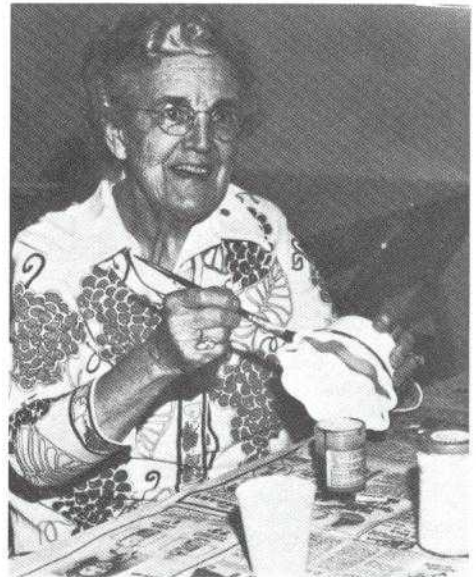
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it works  
for all of us.**



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

November-December 1976  
Volume 1 Number 8

# Pathways

SATELLITE



**COMSAT** COMMUNICATIONS SATELLITE CORPORATION  
COMSAT GENERAL CORPORATION

# Pathways SATELLITE

November-December 1976  
Volume 1 Number 8

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*Cover. In the composite photo on the cover a Ford Aerospace engineer appears to be inspecting one of the solar panel "wings" of an INTELSAT V. The size of the model used in the picture is approximately six feet from wing tip to wing tip. The actual satellite will be about 22 feet high, measure 50 feet across with solar panel "wings" extended and weigh approximately 4,100 pounds at launch and 2,000 pounds in orbit. The array of solar cells will be able to generate over 1,200 watts of power.*

PHOTO BY FORD AEROSPACE

COMSAT President Joseph V. Charyk has announced the resignation of James J. McTernan, Jr., as Vice President, Finance, effective November 19, 1976. It is planned, however, that Mr. McTernan, who joined COMSAT in 1970, will continue an association with the corporation, performing special assignments for the President. Carl J. Reber, Assistant Vice President, Financial Administration, will carry out Mr. McTernan's responsibilities as Acting Director, Finance.

to members of the  
communications satellite  
corporation family  
and their families.  
we are pleased to take  
this opportunity to  
extend season's greetings  
and best wishes for  
a joyous new year.

*Joe A. L. Small*

*Joseph V. Shantz*

**T**HE GLOBAL satellite system is about to change shape. INTELSAT will begin in 1979 to launch its next generation of satellites—the INTELSAT V series. In contrast to the spinning cylinders now in orbit, the INTELSAT V's will be cube-like. And instead of ringing the body of the spacecraft, the solar cells on the new satellites will line two flat panels that will extend like wings from a box housing the communications subsystem.

### Enlarged Capacity

Each of the INTELSAT V's will have 27 transponders and be able to carry up to 12,000 two-way telephone conversations plus two television channels. This capacity is twice that of an INTELSAT IV-A satellite and over three times that of an INTELSAT IV.

The new satellites are needed to handle the expanding volume of international communications traffic forecast for the early 1980's. In the Atlantic Ocean region, where approximately 60 percent of global satellite traffic is now concentrated, it is likely that the number of satellite circuits in use will more than double by 1980. In the Indian Ocean region, the number will just about triple during the same period. And, by 1985, the total number of circuits in use in the global system is predicted to be about five times what it is today.

### Body-Stabilization

In design, the INTELSAT V will be unlike its spin-stabilized predecessors. Instead of the body being rotated to steady the satellite and fix its attitude, the INTELSAT V will have a momentum wheel spinning inside to poise the satellite and supply the gyroscopic "stiffness" necessary for precise antenna pointing.

COMSAT laboratories helped develop the body-stabilization concept. It has been used on the Franco-

BY DANIEL N. CRAMPTON

German SYMPHONIE satellites, the RCA domestic satellites, the Communications Technology Satellite and NASA's ATS-6 experimental satellite.

### Use of 11/14 GHz Bands

The INTELSAT V series will be the first in the global system to use the 11

A contract for the manufacture of seven INTELSAT V satellites has been awarded to Aeronutronic Ford Corporation. The contract could involve payments by INTELSAT totaling \$235.5 million. Launch services and related program costs are likely to bring the overall cost of the INTELSAT V program to just under a half-billion dollars (\$470 million). As INTELSAT's Management Services Contractor, COMSAT will administer the program and monitor Aeronutronic Ford's performance under the contract. COMSAT's investment in the program will be determined by its average investment share in INTELSAT during the 1976 to 1985 period. Currently, the U.S. share in INTELSAT is 30.5 percent.

and 14 GHz frequency bands in addition to the conventional 4 and 6 GHz bands now shared by both satellite and terrestrial microwave communications. Because of crowding at the 4/6 GHz ranges, use of new bandwidth at the higher frequencies will improve system capacity and flexibility.

Through a "cross-strapping" technique on the INTELSAT V's, earth station antennas introduced to work with the higher frequencies will not only be able to link up directly with similar ground antennas in the system but with those operating at the lower frequencies as well. A signal sent to the satellite in the 14 GHz range, for

*Ed. Note: The name of Aeronutronic Ford Corporation was changed to Ford Aerospace & Communications Corporation effective December 1, 1976. See Box on page 4.*

example, can be transferred by the satellite into a down-link signal in the 4 GHz range.

### Frequency Reuse

Antennas on the satellite will generate earth, hemispheric and zone coverages at 4 and 6 GHz, and spot beam coverages at 11 and 14 GHz. The shape of the zone coverages can be reconfigured by ground command, and the spot beams can be steered to point in the direction desired. As on the INTELSAT IV-A satellites, the angular separation of the spot, hemispheric and zone beams will permit signals from different geographical areas to share the same frequencies.

Frequency reuse in the 4/6 GHz ranges will also be achieved by dual polarization, a technique already employed on COMSAT GENERAL's COMSTAR satellites being used for U.S. domestic communications. Through dual polarization, signals polarized at different angles to each other can travel to and from the same geographical area on identical frequencies.

### The Space Shuttle

The INTELSAT V satellite is designed to be compatible for launch either by an *Atlas/Centaur* launch vehicle or by NASA's Space Transportation System (the Space Shuttle). Tentative plans are for the first four launches to be by *Atlas/Centaur* and the next three by the Space Shuttle, scheduled to begin commercial service in 1980.

The Shuttle is an all-purpose, reusable transportation system, consisting of an Orbiter, two solid-fuel rocket boosters and a large external fuel tank to feed the Orbiter's main engines. The piloted Orbiter will resemble a conventional airliner and carry a crew.

For an INTELSAT V launch, the Orbiter's 15-foot by 60-foot cargo bay will contain the satellite, a spin table mechanism, and a Spin-Stabilized Upper Stage (SSUS). At vertical liftoff,



# INTELSAT V: a new design for the 1980's

## New generation of communications satellites to be body-stabilized with twice the capacity of IV-A's

the Orbiter will sit piggy-back atop the external tank. Shortly after take-off, the rocket boosters attached to the fuel tank will fall away, their cases designed to be retrieved from the ocean for reuse on subsequent launches. Later in the ascent, the fuel tank will be jettisoned.

About an hour into the flight, when the Orbiter and its payload have attained a circular orbit of about 160 nautical miles, the cargo bay doors will be opened, and the spin table with the satellite and ssus attached will be lifted into place and set spinning at 45 rpm. The satellite and ssus will then be released from the table and the Orbiter will back off to complete its mission and eventually return to earth, making a conventional runway landing.

After parting from the Orbiter, the satellite and ssus will coast for up to 45 minutes. Then the ssus perigee kick motor will be fired to propel the satellite into an elliptical transfer orbit, and the satellite will separate from the ssus. The rest of the launch will follow the usual sequence except that, after apogee motor firing when the satellite is in a near circular orbit 22,240 miles over the equator, the spacecraft will be despun to stop its rotating motion, the solar arrays will be extended, the satellite will be oriented for communications and the

momentum wheel inside the body will be activated to steady the satellite as it moves in orbit.

AS INTELSAT's Management Services Contractor, COMSAT has also been authorized to explore the possibility of launching INTELSAT V's via the European Space Agency's expendable launch vehicle—ARIANE.

### Launch Schedule

A pair of INTELSAT V satellites are slated to become the Atlantic Primary Path and Spare in 1979. By then, the IV-A Primary Path, which links nearly all of the Atlantic region countries, will have reached saturation. Two more INTELSAT V's, planned for launch in 1980, are scheduled to take over as Primary Path and Spare in the Indian Ocean region. When this occurs, two IV-A's will likely be moved from the Indian Ocean to replace INTELSAT IV's over the Pacific, which will be near the end of their useful lifetimes. Circuit demands are not expected to require INTELSAT V's in the Pacific before 1985.

The INTELSAT Board of Governors has not yet determined the timing of INTELSAT launches for the 1982-1985 period, although various alternative space configurations are under study. All of them involve at least a minimum of three in-orbit V's in the Atlantic and two in the Indian region, with two backup spacecraft available in case a launch failure or other mishap occurs.

### Delivery

According to the terms of the contract, delivery of the first INTELSAT V satellite will be made by July 1, 1979, and the second, by October 1, 1979, (33 months and 36 months, respectively, after the effective date of the contract). The other five satellites in the series are to be delivered every four months thereafter, with the last to be ready by June 1, 1981. The contract also gives INTELSAT the option to procure, within the next five years, eight additional spacecraft from Aeronutronic Ford.

### Terms of Payment

The \$235.5 million total for seven spacecraft consists of a delivery price of \$176.7 million to be paid in installments to Aeronutronic Ford as certain program "milestones" are achieved. The remaining \$58.8 million—one-third of the delivery price—is to be paid in the form of incentive payments based on the successful in-orbit performance of the satellites over their seven-year design lifetimes.

For each satellite functioning satisfactorily, \$840,000 would be paid after 90 days, and another \$840,000 nine months later. Annual payments during each of the six remaining years of the satellite's lifetime would be \$1,121,000 for the first three years and \$1,120,000 for the last three, amounting to a total of \$8,403,000 per spacecraft. If for any reason a satellite fails to perform as expected, these payments would be reduced accordingly.

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*Mr. Crampton is in the Office of Public Information.*

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# INTELSAT contract with Ford Aerospace: largest single award for communications satellite series

*"We are deeply honored to be selected . . . to undertake this major space effort . . .," says Ford Aerospace President Hockeimer.*



The Aeronutronic Ford Western Development Laboratory at Palo Alto, California. In addition to the buildings and test facilities at center of photograph, Aero Ford also occupies the cluster of white buildings at upper left in which the COMSAT INTELSAT V liaison team will maintain offices.

BY LARRY G. HASTINGS

About 35 miles south of San Francisco lies the city of Palo Alto, population 52,600. Much of commercial Palo Alto is composed of industries which support the needs of San Francisco and others which provide products used nationwide. Foremost among the latter is Aeronutronic Ford Corporation, a division of Ford Motor Company. It is that division which will play a significant role in the growth of INTELSAT, COMSAT and world communications in the coming decade.

Aeronutronic Ford has been award-

*Mr. Hastings is a COMSAT Senior Information Officer.*

The name of Aeronutronic Ford was changed to Ford Aerospace & Communications Corporation on December 1, 1976 (after PATHWAYS had gone to press). In announcing the change, President Henry E. Hockeimer said, "The name change will identify more clearly those various activities of the corporation, domestic and international, selling products and services to government agencies, the military and industrial consumers."

ed the contract for the new INTELSAT V series of communications satellites. The contract is the biggest ever awarded by INTELSAT, and the largest single contract ever awarded for commercial communications satellites. While the Aeronutronic Ford contract is valued at \$235.5 million, the total dollar value of the INTELSAT V pro-

gram, including launch and related costs, will reach nearly a half billion.

Who is the Aeronutronic Ford Corporation and what is an "aeronutronic"? The people at Ford explain that word as follows: "'Aero' comes from the word 'aerodynamics'; 'nu-', as in 'nucleonics' and '-tronic' from 'electronics.'" Ford chose that name

PATHWAYS

when it founded the subsidiary in 1956.

The nucleus of the new company was a group of 30 high-level scientists which had been organized earlier under the name of Systems Research Corporation, engaged in research and development.

Ford Motor Company had traditionally produced equipment for the U.S. government as a subcontractor, *i.e.*, building to someone else's design. The formation of Aeronutronic Systems put Ford into the aerospace/defense business as a primary source of military and space products. Operations began in Van Nuys, California, and later moved to temporary offices in the passenger terminal building at Grand Central Airport in Glendale.

The company gained recognition in 1957—the *Sputnik* period—when it acted as prime contractor for an Air Force rocket project known as *Far Side*. This was a program designed to launch a missile into space after it had been carried to an altitude of 100 thousand feet by a large balloon. A total of six such launches were carried out by the Air Force and Aeronutronic at Eniwetok in the South Pacific.

The same year, Ford signed a 99-year lease for a 200-acre site in Newport Beach, California, for its new headquarters. By mid-1959, employment had risen to about 900 and Aeronutronic was merged into Ford with full divisional status.

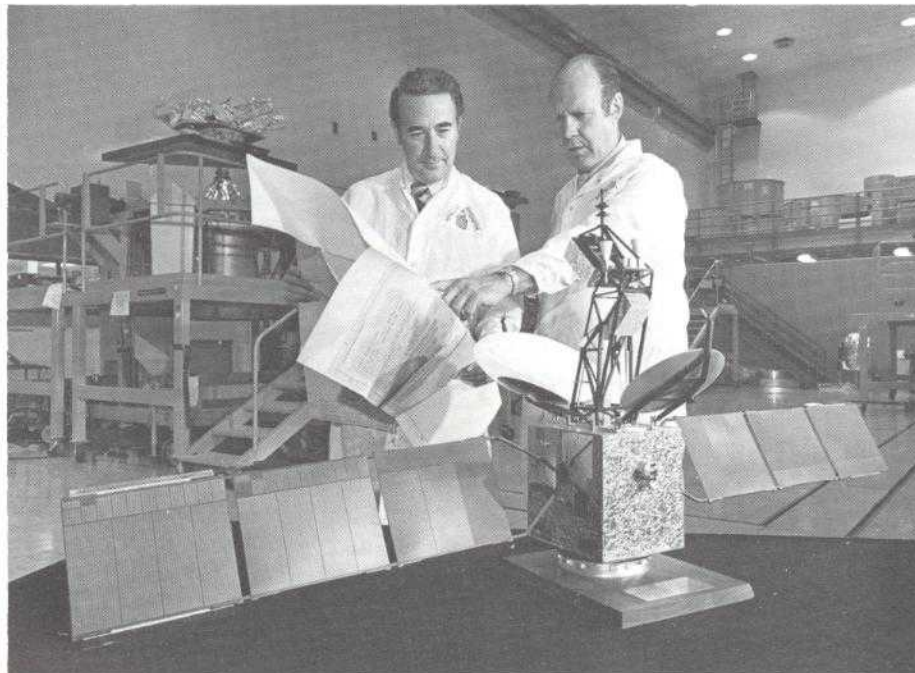
In 1961, Ford purchased the well-established Philco Corporation, which included the Western Development Laboratories Division, the space-oriented division of Philco. This acquisition further broadened the company's range of activities into non-automotive fields. Later, Ford transferred the Aeronutronic Division to Philco to strengthen both organizations as well as its own position in the defense and aerospace fields. The parent company felt that this latter move would permit better utilization of facilities, management and technical staffs.

Five years after it acquired Philco, Ford changed the name to Philco-

Ford Corporation. This, it was felt, would establish a greater public recognition of the direct parent-subsidary relationship of the Ford and Philco organizations as well as underlining the growing importance of Philco in the worldwide Ford operations.

Today, that alliance between Ford and Philco, known as Aeronutronic Ford Corporation, has a record of many successful satellite programs

Among the many satellites built by Aeronutronic Ford are the Synchronous Meteorological Satellites; NATO satellites; and Engineering Test Satellites (ETS) for Japan. Ford is justifiably proud of its role in the sensational Mars/Viking program, too. Aeronutronic Ford's Western Development Laboratories (WDL) at Palo Alto provided the communications antenna sub-systems for the



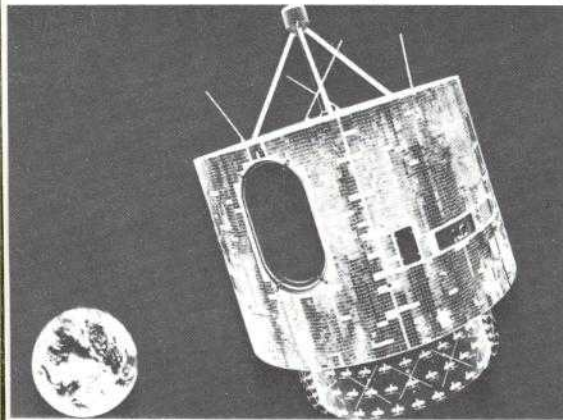
Louis J. Bruno, left, Manager of International Relations for Aeronutronic Ford, and Jack E. Richards, Deputy Program Manager, INTEL-SAT V, check engineering specifications with satellite model.

as well as being a recognized builder of earth station antennas and earth stations. Three of the earth stations are for the MARISAT program. Seven antennas have been built for American Telephone and Telegraph (AT&T) use at that company's earth stations which communicate through the COMSAT GENERAL-owned COMSTAR satellites. Of special interest is the fact that Aeronutronic Ford built and installed the 92-foot antennas at the COMSAT-operated earth stations at Jamesburg, California, at Etam, West Virginia, and at Pau-malu, Hawaii.

Viking Orbiters, and transponders—combined receivers and transmitters—whose function is to transmit signals automatically when triggered by an interrogator for the Viking Landers. Input from the Landers are received by the Orbiters and in turn are relayed to earth by the dual-frequency, high-gain Aero-Ford antennas.

Today, Aeronutronic Ford Corporation employs a total of approximately 10,000 people in its aerospace and communications operations. Headquarters is located in Dearborn, Michigan. Its Newport Beach facility has 2,430 employees on its pay-

# Ford Aerospace: Experienced in Space Communications

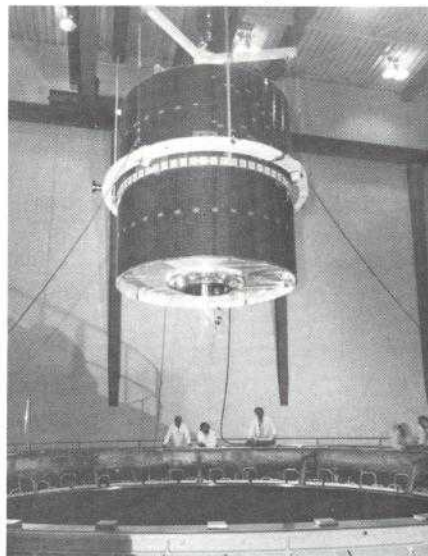


NASA's weather satellite

roll; at Willow Grove, Pennsylvania, the Engineering Services Division has a roster of 3,600 employees.

The Western Development Laboratories Division of Aeronutronic Ford, where the bulk of the work on INTEL-SAT V will be conducted, has about 4,100 technical, clerical, engineering and other personnel on its payroll. At the Palo Alto site the Corporation has more than one and one-third million square feet of buildings located on approximately 200 acres of land. A COMSAT team, headed by Luin B. Ricks, Director, Space Segment Engineering, will be establishing a COMSAT liaison office at the Palo Alto facility.

Under terms of the contract, work began on the INTEL-SAT V satellites on October 1. While most of the work will be performed by Aeronutronic Ford at its Palo Alto facility, com-

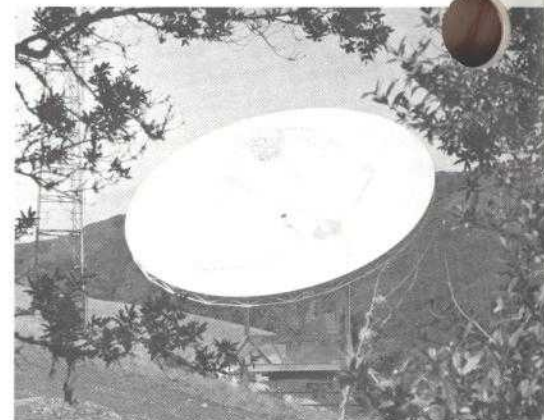


A satellite for NATO

panies in France, West Germany, Italy and Japan will receive \$54.6 million in subcontracts.

When advised of the awarding of the contract to Aeronutronic Ford Corporation, Henry Ford II, Chairman of the Board, Ford Motor Company, said that "the new satellites will bring a new dimension to global communications and provide greatly expanded capacity and services for international communications by satellite."

In referring to the INTEL-SAT V contract—the largest single award ever made for a commercial communications satellite system—Henry E. Hockeimer, President of Aeronutronic



Antennas for AT&T

ic Ford Corporation, said that his company was "deeply honored to be selected by the International Telecommunications Satellite Organization to undertake this major space effort [and especially] because of its long and continuing involvement in international communications."

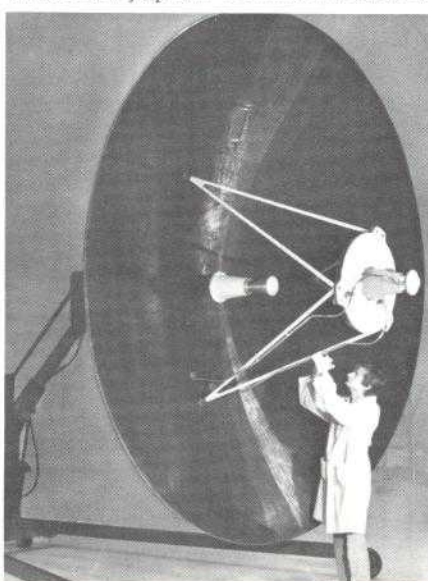
Of the first seven INTEL-SAT V satellites, at least the last three are planned for launch by America's newest stride forward in space technology, the space shuttle, built for NASA by Rockwell International Corporation. INTEL-SAT has the option of purchasing an additional eight INTEL-SAT V's, all of which would be launched from the space shuttle.

The initial satellites of the new series will be launched by *Atlas/Centaur* rockets, manufactured by the Convair Division of the General Dynamics Corporation.

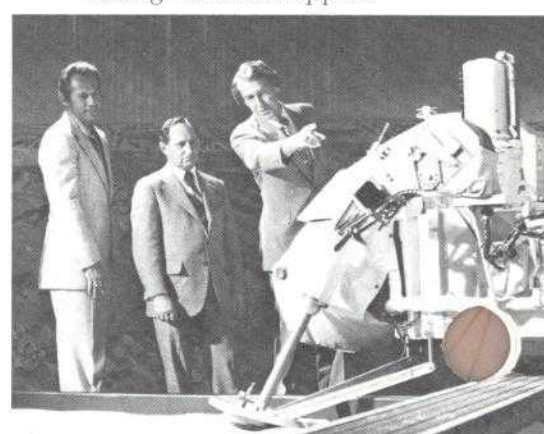
Protoflight model for Japan

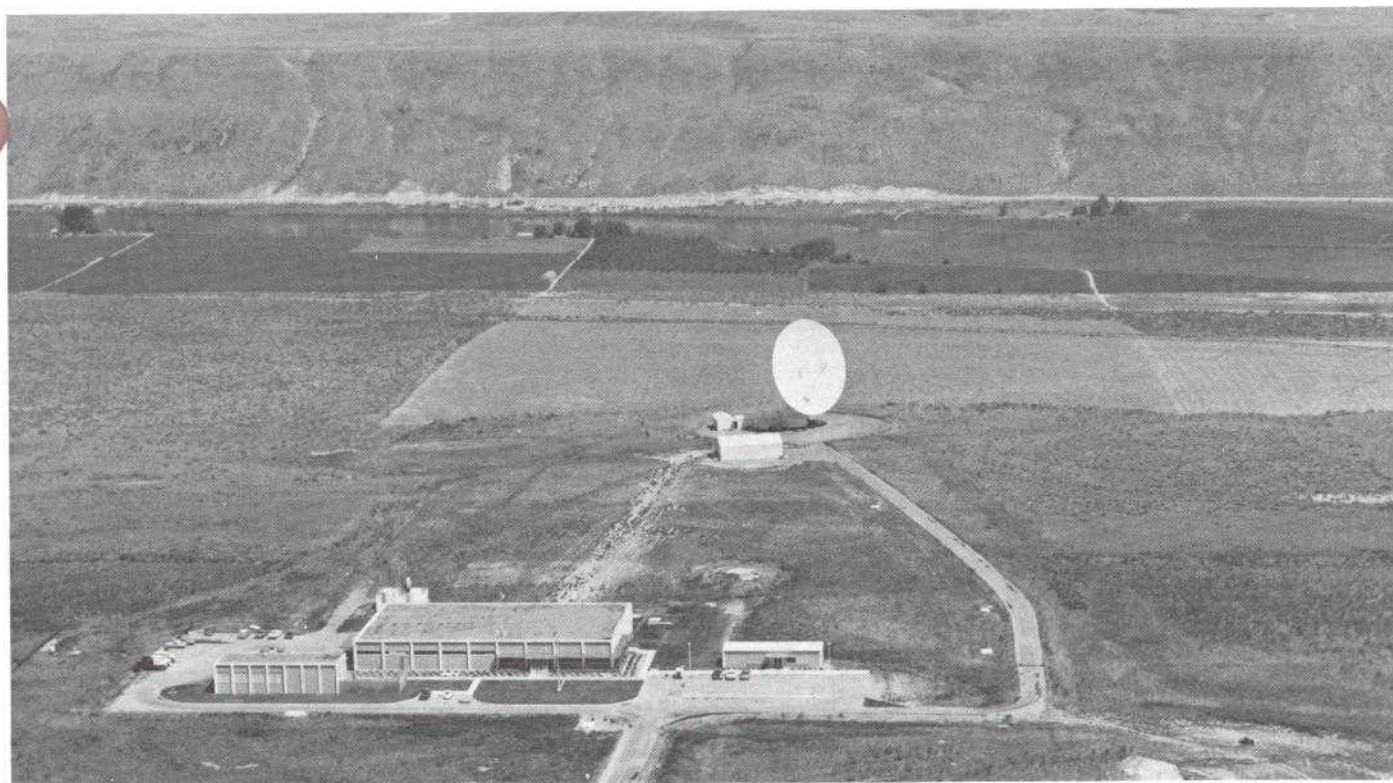


Mariner/Jupiter communications



Viking Mission support





The Brewster Earth Station in Washington State.

## Brewster Station completes decade of service to COMSAT

*Land of Lewis and Clark; doorway to the development of the Northwest Territory; site of the first American Flag over the State of Washington; location of the COMSAT-operated Brewster Station.*

*The story on Brewster, Washington, in this issue is another in the series of special features designed to acquaint PATHWAYS' readership with COMSAT and COMSAT GENERAL earth stations and the regions in which they are located. Contributing to this feature are Brewster Earth Station Manager W. M. Lauterbach, former Station Administrator Imogene L. Cook, Burton L. Falkofské of U.S. Systems Operations, Sam L. Hall of the U.S. Bureau of Outdoor Recreation, Bernard C. Collins of Norwood, Massachusetts, and PATHWAYS Editor John J. Peterson.*

*Appreciation is extended to Mr. Emil B. Fries of Vancouver, Washington, for his authorization to include portions of the book From Copenhagen to Okanogan authored by his father U. E. Fries, one of the early settlers of the Washington Territory.*

PHOTOS BY JOHN PETERSON

COMSAT's earth station at Brewster, Washington, lies in the valley formed by the juncture of the Columbia and Okanogan Rivers, two of the main arteries of the fur trade leading to the development of the Great Northwest.

Situated 32 minutes by air from

Spokane and 45 from Seattle, Brewster, in the Evergreen State's Columbia Basin, is literally surrounded by some of the most majestic wonders of the world, natural and man-made.

To the north, and merging into the Cascade mountains on the west, are the beautifully rounded, broad, low

hills of the Okanogan Highlands, interrupted with divides often 6,000 feet in elevation but never sharp or abrupt. Southward, from the Canadian border, the Columbia Basin extends itself, forming the geography of the Big Bend country eastward almost to Idaho, consisting of sage and scabland and scarred by great, dry, ancient river courses.

Looking west from Brewster, the Cascade Mountains stretch in hour-glass form from the Canadian to the Oregon boundaries—100 miles wide at the boundaries and 50 miles wide at the middle. Such natural wonders compete with the man-made marvel of the Grand Coulee Dam nearby which captures the mighty Columbia River and makes a vast artificial lake more than 150 miles long, stretching to the Canadian Border.



The City of Brewster, partially obscured through the foliage, nestles on the bank of the Columbia River overshadowed by Brewster Flats. Above the Flats, a short distance away, COMSAT's antenna overlooks the city and the juncture of the Okanogan River and the mighty Columbia.

The Columbia enters the United States from the southeast corner of British Columbia. It follows a rambling course through Washington, joined along the way by tributaries, the great River of Spokane (replenishing the Grand Coulee Dam in passing) and the Okanogan 30 miles below the dam. Continuing past Lake Rufus Woods formed behind Chief Joseph Dam at Bridgeport, Fort Okanogan and Brewster, Lake Pateros and Wells Dam, the Columbia eventually forms the border between much of Oregon and Washington before emptying into the Pacific Ocean at Astoria.

(Mr. Fries notes that the lake formed by Chief Joseph Dam was named after Rufus Woods, founder and longtime editor of the *Wenatchee Daily World*, and among the first and most persistent promoters of the Coulee Dam projects and other dams on the Columbia.)

Historians allude to weather and the reluctance of ship captains to approach an unfamiliar coast as the reasons for delay in the discovery of the Columbia for at least two decades, before the intrepid Yankee trader

Robert Gray made his way between sand bars through a passage into the mouth of the river he would name after his ship the *Columbia*. The date was May 12, 1792.

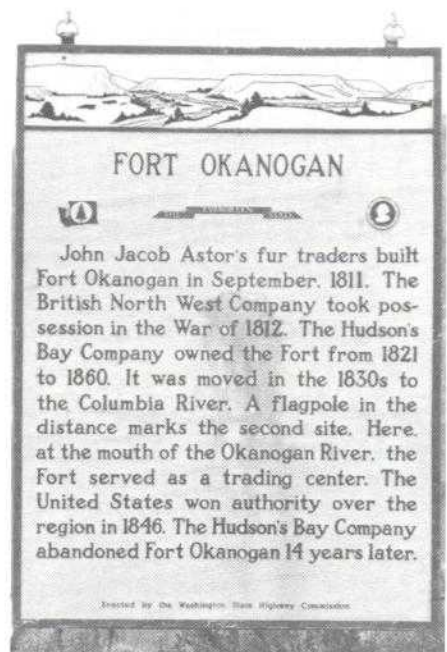
Not many years were to pass before the Journals of the Lewis and Clark Expedition would record the first sighting from land of the mighty Columbia in October 1805, after almost a year-and-a-half journey overland through the present States of Missouri, Kansas, Iowa, Nebraska, South Dakota, North Dakota, Montana, Idaho, Washington and Oregon.

By 1810 the Northwest Company built the Spokane House near the present City of Spokane. Fort Okanogan, at the mouth of the Okanogan River (on the outskirts of the City of Brewster), was established as a trading post with the Indians by the Astor Company. According to historians, it was here at Fort Okanogan that the American flag was raised for the first time in what is now Washington State, September 1, 1811. The flying of the American flag at Fort Okanogan in 1811 was the strongest

point on which Americans based their claims for all territory south of the Forty-Ninth Parallel. (Mr. Fries was present to see a commemorative flag placed at the same historic spot on September 1, 1911.)

Within 10 years the Hudson Bay Company had expanded its vast inland empire to include the Northwest Company. In the following decade, with England and the United States unable to establish definitive arrangements for the abundance of English and U.S. settlements springing up, the two countries concluded a treaty permitting the continuance of joint settlements.

During the 1840s a flood of Americans poured over the Oregon Trail to settle in the Northwest Territories, only to find a vacuum in government and administration. Consequently, in 1843, they established their own provisional governments. As it became obvious that Americans were rapidly outnumbering the English settlers, to prevent dissension—and possibly bloodshed—the United States and Great Britain, in 1846, signed a treaty establishing the 49th



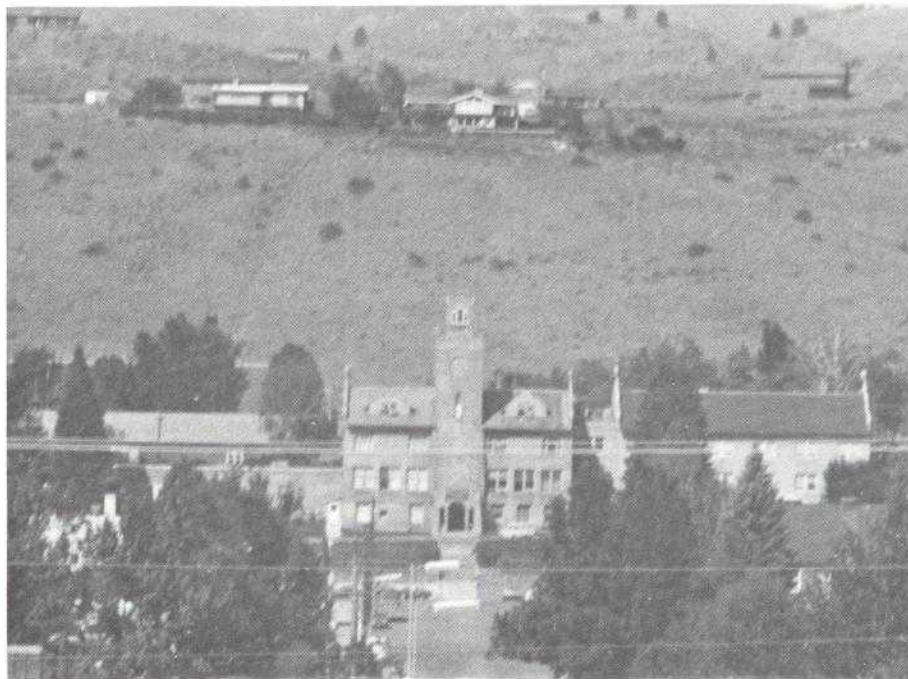
On the outskirts of Brewster, a historical marker identifies the site of Fort Okanogan built in 1811 by the Pacific Fur Company and over which the first American flag in the Washington Territory was raised.

Parallel as the dividing line between their respective territories.

Congress created the Oregon Territory in 1848; however, the people living north of the Columbia River were substantially removed from the seat of government at Salem and considered themselves an ineffective minority. This was remedied in 1853 with the creation of the Washington Territory with a temporary capital at Olympia. In 1889, Washington became the forty-second state admitted to the Union.

The first settlers to come to the valley came to hunt for gold and to trap (gold discoveries were made in the 1850s) lured by dreams of riches in gold or furs. Camps sprang up, living quarters were established, food demanded and markets made for men to live in a civilized manner. And, as years went by and men learned that every hill was not a gold mine, gold fever gave way to those occupations for which many were suited. Many of the successful pioneer stockmen and farmers originally came to the valley in search of gold but instead became prosperous in cattle and agriculture.

As the gold fever waned, the pioneer farmer with his sturdy wagon and ox team settled in the valley determined to conquer the wilderness. "At the time," Mr. Fries relates, "there was only one bachelor in that area. It was Mr. Lumsden who operated a Trading Post for Indians and miners en route to the mine fields along the Fraser and Thompson Rivers in British Columbia. When my



Records of the Omak City Library note that the courthouse in Okanogan County, the county in which the Brewster Earth Station is located, was built in 1915, when the population of Okanogan was approximately 600 persons, at a cost of around \$19,000. The earth station is less than 20 miles south of the county seat.

father forded the Okanogan River at the Lumsden Trading Post in April of 1887, there was neither a settlement nor signs of one in the immediate vicinity. The closest bachelor lived ten miles upstream with another four miles to the only white family in the whole vast area of the Okanogan Valley, which now comprises the towns of Monse, Malott and Okanogan, the County Seat."

Some highlights of Brewster's development were carried in the Golden Anniversary issue of the Herald-Reporter in 1951, written by Brewster correspondent Alma Greaves. Following are extracts from her feature.

Roll up the shades for a glimpse of Brewster just before the turn of the century. Now focus your binoculars on Virginia City which was located near the west end of the Brewster bridge 60 years ago.

Virginia City was named after Virginia Bill, a famous character who made and lost a fortune in Virginia City, Nevada. He had come north to seek another fortune and was lost eventually in the trek to the mining camps along Frazier River in British Columbia.

Captain Clifford Griggs was building a loading port at Virginia City and was buying all the lumber he could secure for the townsite. Two

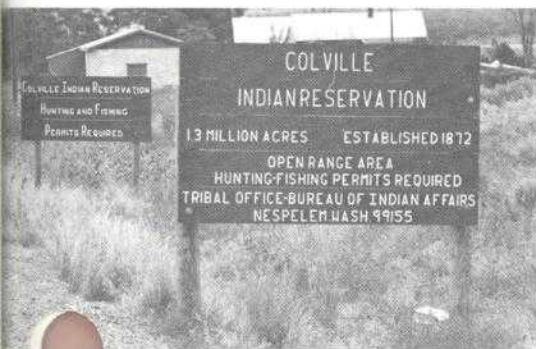
young men, Dan Gamble and Billy Robinson, had been mining at Ruby, near Loomis. When the price of silver dropped to 63 cents per ounce everything in Ruby was abandoned and these two young men dismantled the deserted structures in Ruby, built a raft, and floated the lumber down the Okanogan and Columbia Rivers to Captain Griggs.

"Cap completed the port at Virginia City and began the erection of store buildings. He built a store for general merchandise which was rented to Tony Andersen and then erected a two-story hotel which housed a saloon, both of which were operated by Bruce Griggs."

Between trips from Ruby to Virginia City, Dan Gamble studied the hinterland and one day electrified the inhabitants of Virginia City by saying, "Boys, there will never be a town here. Virginia City will be by-passed if and when a railroad should ever come through here." (Construction of the North Pacific Railway was completed in 1883 and a great flow of new people into the Northwest followed.)

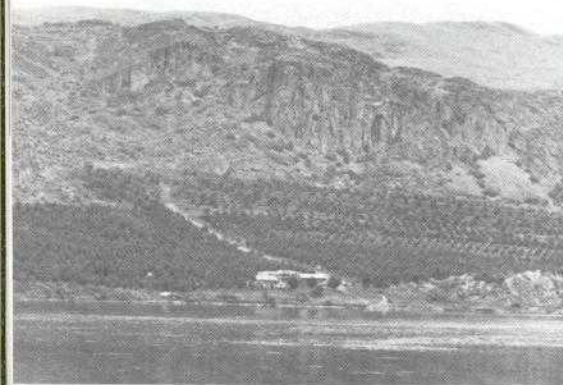
In response to the question of the site of the railroad a jackpot was won 20 years later by young Gamble who had named the possible location within 20 feet.

After much discussion it was unanimously decided to move the town up the river to the spot where Brewster now stands. Land was purchased from a "John Bruster" who owned a peach



A short drive from Brewster brings one to the vast Colville Indian Reservation.

Central Washington, the location of the Brewster Earth Station, is semi-arid. Irrigation provided by the Grand Coulee Dam combines with the climate to support a substantial agricultural output. Delicious red apples are the mainstay of farming activities while other products include pears, grapes, wheat, beef and some sheep. Brewster serves the needs of the surrounding farming communities.



In the photograph at top an orchard seems to literally climb up the side of overhanging cliffs from the edge of the Columbia River. In the center photo, cottages for migrant workers are uniformly aligned near an orchard. The photo at bottom was taken inside a cooperative processing plant in Brewster.

orchard on this site whereby Brewster became a port town adjacent to boat as well as possible railroad transportation. Owing to the fact that a clerk in the patent office in Washington, D.C., wasn't sure John Bruster spelled his name correctly, he changed the spelling to "Brewster" when he registered the patent and no effort was ever made to change its spelling. Virginia City was now abandoned and merchants began to make permanent improvements in the new town of Brewster.

Boats were now leaving on schedule—nine hours up from Wenatchee and five hours back down. There was little difficulty experienced on the down trip but the up-trip was uncertain. The rapids at Entiat, Chelan Falls and Pateros were difficult. It

was not uncommon to be stranded on the rocks and delayed hours and, possibly, days. In such cases the boatswain would go ashore to snub the cable to a "dead head" on the river bank in order to permit the steamer to pull itself upstream by winding the cable on its "dead man" or capstan.

Brewster was now definitely the head of navigation and in high water steamboats could sometimes go as far north as Riverside. Passengers and freight going to Methow or the Okanogan valleys were now distributed from the Port of Brewster.

What a sight to see freighters and passengers departing through a cloud of dust to the tune of bells on the lead horses, staccatoed to the loud and profane commands of the drivers.

## Early Danish emigrant writes of Brewster's beginning

In his book *From Copenhagen to Okanogan*, Ulrick E. Fries, who emigrated from Denmark and settled in the Okanogan country of the Washington Territory in 1887, tells of the founding of Brewster. Following are paraphrased excerpts from his book.

\*\*\*

The first to come [to the Okanogan Valley] were the fur traders who dominated the region from 1811 to 1850 from their post at Fort Okanogan. In 1858 occurred the Fraser River gold rush and the old trails of the Hudson Bay Company trappers now led men in search of gold. In 1862 gold was discovered at Rich Bar in the vicinity of Brewster. Incidentally, the name of Rich Bar disappeared with the early miners. It was estimated that as many as 500 miners were busily engaged in washing gold for 15 miles along the river, or roughly, between the present towns of Pateros and Bridgeport (which includes Brewster).

As much as \$100,000 in gold was estimated to have been taken from Rich Bar. The discoverer reportedly made his fortune of \$30,000 in two months. These miners left no visible trace of civilization and even made their campfires with the logs of Fort Okanogan.

On the heels of these miners came the Chinese from California, working

the abandoned diggings of their predecessors or buying out others. As the country settled, the Chinese moved out. Aside from an occasional trace of an old ditch (the Chinese had combined agriculture with mining and built extensive ditches to maintain an adequate supply of water for both), a rubble heap, or an abandoned dugout, the only monument to the Chinese in north-central Washington is the little town of Chesaw named after Che Saw, one of the Chinese miners who turned to agriculture, becoming a good farmer and cordial host.

From the time of the first settlement down to the depression of the thirties, placer mining has been attempted along the river near Brewster. Although the name of Rich Bar has been lost, there is still reason to believe that a layer of pay dirt underlies the town of Brewster as well as some other flats along the river.

The confluence of the Columbia and the Okanogan determined where the head of navigation should be. So it was inevitable that some kind of town would be situated here since, in the early days, there were no railroads within 100 miles, river transportation furnished the only outlet for the region. In fact there were four little towns, but only one, Brewster, survived.

Initially recorded in 1893 as Casi-



## Service to exotic and mystical lands of the Pacific

COMSAT in 1964 was laying out the initial elements of the global satellite system. In addition to arranging for use of EARLY BIRD (INTELSAT I) in the Atlantic Ocean Region, COMSAT was preparing for the development of Pacific Ocean satellite service and searched for radio-interference-free sites on the West Coast. On July 12, 1965, President Charyk signed an application to the FCC requesting authority to construct a new Earth Station at Brewster Flats, Washington. The FCC granted approval on October 14, 1965.

The INTELSAT II satellites were planned to be available in the fall of 1966. Anticipating that a large 85-foot antenna could not be constructed by that time, COMSAT arranged to have Page Communications construct a 42-foot transportable station in order to assure meeting NASA's forthcoming Apollo Program service requirements.

The INTELSAT II (F-1) satellite was launched in October 1966. It failed to achieve synchronous orbit but did provide limited services between the U.S. mainland and Hawaii. On Thanksgiving Day, the 85-foot antenna was used for transmission of a football game to Paumalu. However, the Page antenna continued to be used for limited service to Hawaii from December 8, 1966, to January 27, 1967, while final adjustments were made on the large antenna.

INTELSAT II (F-2) was launched

mo, Virginia City, as it came to be called, became the main port of call for unloading freight; however, it had one drawback: when the water was low, the wharf boat would become stuck on a rock sticking up on the bottom of the river requiring a lot of work to get it clear again. But "Bruster's" place was ideal and, with the recording of the new townsite and the change of landing place, Virginia City was doomed. Nearly all the buildings were moved bodily the half mile to "Bruster."

January 11, 1967, and was placed in service on January 27. The 85-foot antenna was used for full-time service thereafter. In the spring of 1967, the 42-foot antenna was dismantled for transfer to the Philippines.

To prepare for the third generation of INTELSAT satellites, the FCC in March 1968 approved a COMSAT application for new LNR's (Low Noise Receivers), new GCE (Ground Communications Equipment) and a new antenna feed. On August 23, 1968, COMSAT made application to the FCC requesting authority to increase the

was operational February 14, 1972, and the INTELSAT IV (F-8) by December 15, 1974. Throughout that period Brewster continued to provide service to Hawaii on the Primary Pacific satellite. The commencement of the transponder lease service to Hawaii in February 1974 precluded recommencement of diversity operations after the spare INTELSAT IV was available.

The Hawaii transponder lease terminated July 26, 1976, when the Hawaiian traffic was transferred to a domestic satellite system. COMSAT then made arrangements with ESOC, with INTELSAT and with the foreign administrations to transfer approximately half of the Pacific destinations



Staffing the Brewster Operations Center are, left to right: Station Manager W. M. Lauterbach, in foreground, Operations Supervisor Darrel Nelson and Senior Electronics Technician Don Allen.

antenna diameter from 85 feet to 97 feet. Approval was granted less than a month later.

The new Jamesburg Earth Station became operational December 1, 1968, and the INTELSAT III (F-3) and (F-4) satellites began operation on February 16, 1969, and May 31, 1969, respectively. In early 1969, all Brewster service was transferred to Jamesburg in order to permit modification of the Brewster antenna. All station modifications were completed by September 1969.

For the next several years Brewster provided diversity service to Hawaii by the operational spare satellite in the Pacific region. By 1971, satellite system planning mandated that all of the service be carried on a single INTELSAT III. The INTELSAT IV (F-4)

from Jamesburg to Brewster.

Service to New Zealand was transferred from Jamesburg to Brewster August 25, 1976, which was the first international service carried by Brewster since early 1969. By early October 1976, Brewster was also providing international service to Peking, Thailand and Korea. Future plans for Brewster include service to the Fiji Islands and to New Caledonia, plus service to Malaysia and to French Polynesia when their stations are activated in 1978.

The Brewster staff at commencement of operations in 1966 consisted of 37 people. Of the 37 people, four of the originals remain at Brewster and 10 have transferred to other COMSAT locations. There are now 20 permanent employees at Brewster.

The immediate area surrounding Brewster is a veritable paradise for the sportsman and outdoorsman. Trout fishing and hunting game provide the sportsman with year-round opportunities, and the story is told of how, "in the old days," the people from Seattle would make winter trips to Okanogan and Douglas Counties to hunt deer, let Mother Nature freeze the catch on the spot, then haul the meat back to Seattle.

For the outdoorsman and nature lover, natural and

man-made wonders are in abundance, all within easy driving distance of Brewster. Still, there is more than enough left over for the historian: the little Indian cemetery on the side of the hill above the Okanogan River near the tiny settlement of Malott; the Fort Okanogan Museum overlooking the Columbia.

The photographs on this page attempt to depict a composite of the three: nature, recreation and history.

Winthrop, a partially restored pioneer mining village on the edge of the North Cascades National Park. The town has all of the flavor of the old west and still retains the title of Marshal for its law enforcement officer.

An advertisement painted on the side of a drug store in Winthrop that proved too great a photographic temptation to resist.

Approaching Winthrop from Twisp, on Route 20 through Methow Valley, the camera captures this picture of a man apparently at peace with himself and the world around him.

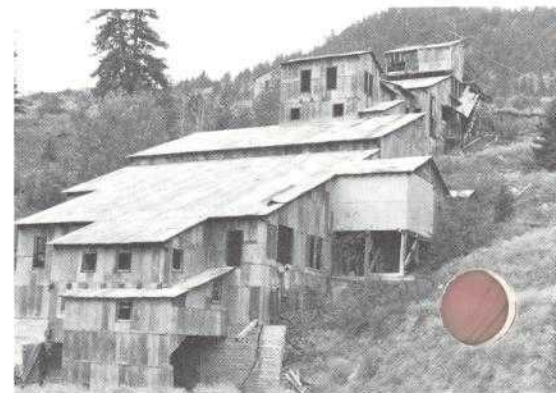
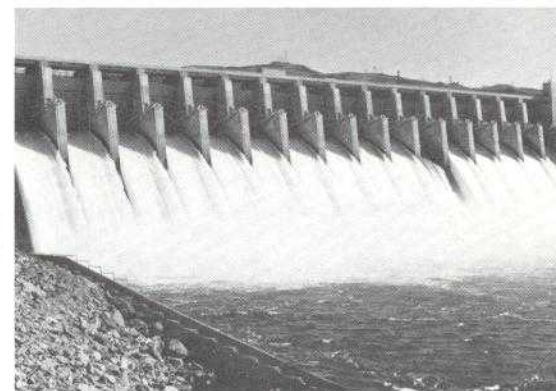
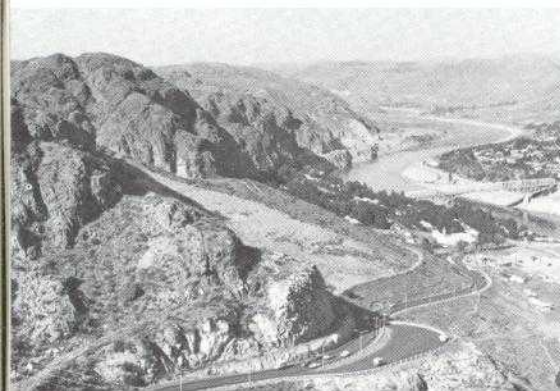
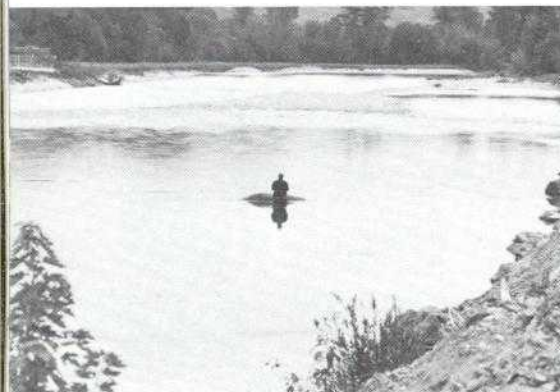
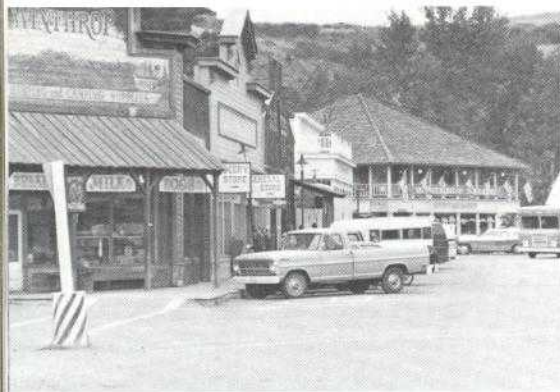
Beyond Winthrop, Route 20 turns into the North Cascades Highway and cuts through some of the most magnificent landscape to be seen by man as it makes its way toward the Pacific Coast. Dwarfed by the immensity of the Cascades is the automobile visible in the right center of the photograph.

Approaching Grand Coulee City at the base of the dam (extreme right center) one is struck by the volcanic formations through which the builders of the dam had to carve their way.

A segment of the Chief Joseph Dam on the Columbia River at Bridgeport prior to joining the Okanogan at Brewster. Named after Chief Joseph, a great Indian leader of the Nez Perce tribe, the dam holds back the Lake Rufus Woods reservoir which extends to the Grand Coulee Dam.

The Chillowist Cemetery on a hillside near Malott upriver from the earth station. Fourteen whitewashed and sparkling headstones dominate the grounds and add an air of mystery to the setting; all 14 bear the name "Walsh," 11 of which are inscribed simply "Baby Walsh" lacking both dates and ages.

A Forest Ranger and an old-time resident of the logging town of Twisp pointed out the location of this old abandoned copper mine now used as a shelter for free-running horses.



# INTELSAT Board of Governors approves \$5½ million R&D budget; confirms continuing interest in INMARSAT Committee.

The Twenty-fourth Meeting of the INTELSAT Board of Governors was held from October 27 through November 3 at INTELSAT Headquarters in Washington, D.C. Among its actions the Board:

- Approved a total 1977 R&D program of \$5,456,000, exclusive of procurement, legal and G&A costs, and compensation for use of capital assets. The new program includes \$1,310,000 for exploratory research and studies, \$2,190,000 for development contracts, and \$1,956,000 for in-house work on development projects.

- Authorized the Management Services Contractor to relocate the INTELSAT IV (F-7) from 340.5° to 359° East longitude, where it will carry preemptible leased services, and the INTELSAT IV (F-2) from 359° to 356° East longitude. It approved the Management Services Contractor plans to use the last operating receiver on the INTELSAT IV (F-5) for several months, to carry preemptible leased services. The Management Services Contractor will study long-term plans for positioning satellites to provide Atlantic and Indian Ocean Region services, and analyze the advantages and disadvantages of such locations for providing preassigned and preemptible leased services.

- Approved consolidated performance characteristics for Standard A stations in the INTELSAT IV, IV-A and V systems, new performance characteristics for Standard C (14/11 GHz) stations in the INTELSAT V system, and revised specifications for SCPC/PSK.

- Decided to limit SCPC operation to the previously approved SCPC/PCM/PSK/4φ, and extended the date for mandatory conversion to Standard B operation from June 30, 1977 to December 1, 1977.

- Expressed in the form of a recommendation the finding that no unacceptable interference is expected from an experiment which may be conducted with the Italian SIRIO experimental network.

- Noted that the Advisory Committee on Technical Matters confirmed the appropriateness of the Board's advice to the Assembly of Parties, that there would be no unacceptable

technical interference from the U.S. MARISAT system.

- Approved an amendment to the existing agreement with COMSAT GENERAL for use of INTELSAT TT&C facilities, to cover additional TT&M services until not later than February 28, 1977.

- Authorized the Management Services Contractor to procure FM subcarrier equipment for modification and test; requested it to prepare a performance specification for FM subcarrier system providing audio channels; and conduct field trials of the modified equipment in time for the results to be considered in connection with the final specification.

- Requested the Secretary General to write INTELSAT Parties, Signatories and Administrations, to describe matters of concern to INTELSAT with respect to the 1977 World Administrative Conference for Planning of Broadcast Satellite Service.

- Requested the Management Services Contractor to study existing and new earth station designs with particular emphasis on antenna sidelobe control and to expand the on-going work on antenna sidelobe measurements.

- Approved in principle allotments to Chile and Saudi Arabia of a quarter transponder of spare capacity each, to provide domestic public telecommunications services. Appropriate allotment agreements will be prepared for Board review.

- Requested the Secretary General to discuss with the Saudi Arabian Signatory various methods and timing for providing certain of the services requested by earth stations which meet INTELSAT requirements.

- Requested the Management Services Contractor to provide the Advisory Committee on Technical Matters with criteria for use in connection with earth stations using SCPC modulation, taking into account the need to operate with 3° nominal satellite spacing.

- Granted a one-year extension of approval for the COMSAT earth station at L'Enfant Plaza to access the space segment free of charge for tests and demonstrations.

- Approved a Brazilian non-standard station to access the space segment free of charge for approximately twenty hours of experiments, subject to certain conditions.

- Approved two Saudi Arabian stations of 31.7 G/T, at Jeddah and Riyadh.

## Financial and Legal Matters

- Approved net changes to the Management Services Contractor's 1976 budget of \$14.65 million to cover INTELSAT V satellite and launch vehicle payments, monitoring equipment, INTELSAT V production monitoring, and purchase of FM subcarrier equipment.

- Authorized the Management Services Contractor to dispose of certain surplus INTELSAT property by inviting bids from Signatories.

## Administrative and Organizational Matters

- Decided that the Secretary General should write IMCO to indicate to the INMARSAT Preparatory Committee that INTELSAT wishes to confirm its continuing interest in meeting the possible space segment needs of INMARSAT, and would like to participate in the work of the INMARSAT Preparatory Committee. The Director General will report to the Board on that Committee's work and prepare recommendations on the role and scope of participation appropriate for INTELSAT.

- Noted reports on the Fifth Meeting of Signatories and the Second Assembly of Parties and initiated the necessary followup actions arising from the decisions of those meetings.

- Approved a one-year extension to the term of Mr. Remy Edy, a nominee of the French Signatory, to work with the Management Services Contractor's staff. In early 1977 five additional positions will be available for Signatory nominees.

The Twenty-fifth Meeting of the Board of Governors was scheduled to be held at INTELSAT Headquarters in Washington starting December 8.

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*The preceding report was prepared by Ellen D. Hoff, International Affairs, U.S. INTELSAT Division.*

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## COMSAT reports decrease in third quarter Net Income

COMSAT has reported consolidated Net Income of \$7,607,000, or 76 cents per share, for the third quarter of 1976. This was a decrease from the \$11,837,000, or \$1.18 per share, realized for the third quarter a year ago.

The decrease resulted from the deduction from revenues of amounts required to be placed in escrow, under an accounting and refund order issued by the Federal Communications Commission (FCC), effective June 16, 1976, pending the outcome of

COMSAT's court appeal from the FCC's adverse rate decision of December 4, 1975. In the third quarter, revenues subject to escrow amounted to \$13,933,000, equal to 70 cents per share after taxes. If the accounting and refund order had not been in effect, consolidated Net Income for the quarter would have been \$14,643,000, or \$1.46 per share.

The regular quarterly dividend of 25 cents per share, payable on December 13, 1976, to all shareholders of record as of the close of business on November 12, 1976, was declared by the COMSAT Board of Directors at its October meeting. It is COMSAT's 25th consecutive quarterly dividend and tenth at the 25-cent rate.

## Overseas TV officials visit Plaza



At the Operations Center console, Marketing's Dan Karasik explains a satellite television order to Overseas Television officials while OpCen Coordinator Steve Franco shows Togo TV Editor-in-Chief Quam Sodji how the voice order wire is used to contact INTELSAT system earth stations. Shown, left to right, are: Karasik; S. Brown, Liberian TV producer/announcer; M. S. Shamma, Saudi Arabia director of TV training; D. Ghartey-Tagoe, Ghana TV head of programs; V. Y. Gusev, USSR TV editor; A. Adesola, Nigerian TV editor; A. Noquez, Mexico educational TV; A. Kirca, Turkish TV correspondent/producer; and Franco.

Fifteen members of the 1976 International Broadcast Seminar from various overseas television organizations received a briefing on satellite television and the INTELSAT system at the Plaza recently. The seminar is a program of the State Department operated by the Television-Radio Department of the S.I. Newhouse School of Public Communications at

Syracuse University.

The half-day visit to COMSAT has become a regular feature of the seminar. The project has two broad goals, a cultural one of introducing the members to the people of the United States, and a professional one of understanding the broadcasting system of the United States. The latter is accomplished through an academic

## Foreign countries show considerable interest in national elections

Despite early reports of voter apathy here, there was great interest overseas in the American 1976 national elections. As election day approached—and the polls indicated a close race—orders for satellite television poured into the INTELSAT Operations Center.

According to L. W. Covert, Operations Center Manager, on November 2 and 3, there were 46 satellite TV transmissions, totaling 63 hours and 36 minutes of election news, to earth stations in 23 countries. As some transmissions were received by more than one earth station, the Receive Time was actually 93 hours and 20 minutes for a total of almost 157-half channel hours of television service.

Among the countries receiving the greatest amounts of election coverage were Italy, Iran, Germany, the United Kingdom, Israel, Korea, Japan, the Philippines, Panama, France and Brazil. A number of countries received transmissions via earth stations outside their borders. For example, the U.S.S.R. received coverage via the Raisting Earth Station in West Germany.

program at Syracuse University and through visits to various broadcasting facilities throughout the country.

The grantees are selected and nominated for the program by the U.S. embassy in their country. Usually they are experienced broadcasters whose positions influence the policy and direction of their broadcasting system.

The group was briefed on satellite television by Dan Karasik, of the Marketing Division, on INTELSAT affairs by Jack Oslund of the International Division, and on the INTELSAT Operation Center by Laurence Covert, Operations Center Manager.

This year's visitors were from Argentina, Ghana, Hungary, Indonesia, Mauritius, Mexico, Nigeria, Poland, Saudi Arabia, Taiwan, Togo, Tunisia, and the USSR.

# Third MARISAT launch successful; satellite to begin Navy service January 1977

BY HALE MONTGOMERY

The countdown progressed smoothly on a remarkably clear evening. Thor Delta Launch Vehicle No. 127, with the MARISAT spacecraft nestled in the nose, gleamed in a setting Florida sun on Pad A, Complex 17 at Cape Canaveral. Abruptly, NASA officials announced a malfunction in a switch in the blockhouse, halting the countdown.

COMSAT GENERAL officials and guests in open viewing stands watched and waited. An announcement came over the public address system that the problem had been resolved, and the countdown resumed.

At 6:44 p.m. EDT, on October 14, after an 11-minute delay, the rocket engines ignited in an explosion of smoke and flame. About 25 minutes later, after all stages of the launch vehicle had been expended, the satellite was on its own in space. Later, down-range data confirmed that the satellite had successfully attained a proper transfer orbit.

The launch was an artistic as well as a technical success. The white trail of the rocket could be followed by the eyes of viewers in the blue evening sky for about four or five minutes after liftoff; the strap-on rockets glittered like falling icicles when they were jettisoned in flight.

Two days later, at 8:13 p.m. EDT, with the mission now under the control of engineers of COMSAT GENERAL and COMSAT, the 1,445-pound satellite was thrust into a near-synchronous orbit with the firing of an on-board apogee motor by ground command. After the completion of a series of in-orbit tests, the satellite will be moved to its assigned station of 73° East Longitude over the Indian Ocean, roughly on a line south of Bombay, India. Plans call for the satellite to be ready for service to the U.S. Navy no later than January 1, 1977.

*Mr. Montgomery is Director,  
Business Promotion, Comsat General.*

## Navy Initial User

It is the third and last in the present series of satellites that forms the space portion of the new maritime satellite system, MARISAT.

MARISAT satellites launched earlier this year and now stationed over the Atlantic and Pacific Oceans presently are providing high quality communications service to the Navy, as well as



*Launch of the third MARISAT*

to the commercial shipping and offshore industries.

Initially, the third MARISAT satellite will be used only by the Navy. It also will serve as a spare in orbit and could be repositioned in the event of a failure in either the Atlantic or the Pacific satellite.

The Navy has been leasing full UHF service via the Atlantic satellite since March 25, 1976, and via the Pacific satellite since June 28, 1976. The Navy in September chose to increase its use of the MARISAT System by leasing UHF capacity in the third MARISAT satellite, originally designated as a ground spare, for Indian Ocean service.

The UHF portion of each satellite includes one wideband (500 kHz)

channel, and two narrowband (25 kHz) channels. The Navy leases the UHF capacity for fleet communications between its own fixed and mobile terminals.

## Telephone and Telex

Each MARISAT satellite also contains capacity at L-band and C-band frequencies for commercial maritime users. It is through these frequencies that high quality telex, facsimile, data and telephone communications presently are being provided to more than 30 commercial ships and offshore facilities via the Atlantic and Pacific satellites.

The MARISAT System, now augmented by an in-orbit backup satellite over the Indian Ocean, provides a range of modern telecommunications services to the shipping and offshore industries not heretofore available. MARISAT represents the most significant advance in marine communications since the advent of wireless telegraphy at the turn of the century.

COMSAT GENERAL pioneered and developed MARISAT, and has available for lease more than 85 percent of the commercial capacity of the system. With the inauguration of its MARISAT services in 1976, COMSAT GENERAL truly has become the "communicator to the maritime world."

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In an interview with the press in Cocoa Beach, Florida, on the day of the launch of the third MARISAT satellite, Navy spokesmen had high praise for the MARISAT System.

"It is superb," Rear Admiral George Shick, Commander, Naval Telecommunications Command, told Mary Bubb, Cape correspondent for AP, UPI and Reuters news services. "The quality is outstanding," RADM Shick said. "The clarity of telecon messages via MARISAT satellites versus (conventional) radio is like a Cadillac versus a Model T." Admiral

*(Continued on next page)*

## COMSAT Board of Directors adopts employee stock ownership plan

The COMSAT Board of Directors has adopted an Employee Stock Ownership Plan, effective January 1, 1976. The Plan will enable eligible employees of COMSAT and COMSAT GENERAL, at no cost to them, to become shareholders of the Corporation. The following is a summary of the highlights of the Plan:

- Each employee of COMSAT or COMSAT GENERAL who has worked for 1,000 hours during 1976, or has worked 1,000 hours during the first 12-month period of his or her employment if that period ends in 1976, will be a participant in the Plan as of January 1, 1976. If an employee does not meet the hours worked requirements during 1976, he or she may become eligible in future years. An employee who is not a citizen of the United States and is working outside the United States is not eligible to participate.

- For each year through 1980, the Corporation will transfer cash to a Trustee in an amount equal to the additional one percent investment tax credit available to the Corporation. This amount, which is based on the Corporation's investment in additional property during the year, will be determined when the Corporation's

*(Continued from Page 15)*

Shick and Rear Admiral Sam Moore, Commander, Military Sealift Command, visited the Cape to witness the launch of the third MARISAT spacecraft. News correspondent Bubb used the quotes in her articles for AP, UPI and Reuters.

"Users are ecstatic," Captain Enright told an interviewer. "The capacity of the satellites is being used 100 percent and we have customers waiting in the wings. The Navy is completely satisfied, the Air Force wants it."

"The third MARISAT," Captain Enright added, "will serve from Gibraltar to Guam, and cover most strategic areas in case the Atlantic or Pacific birds fail. And it closes a 1,200-1,500-mile gap along the Equator. About 450 Navy surface ships can receive instructions via MARISAT now."

Federal Income Tax return for each year is filed, and thereafter will be transferred to the Trust. The amount may vary widely from year to year.

- The Trustee will invest the cash in Common Stock of the Corporation. The stock purchased for each year will be allocated among the separate accounts established for each participant in the same ratio as the compensation of each participant bears to the total compensation of all participants for the year.

- Administrative expenses of the Plan will be borne by the funds in the Trust up to the amount permitted by the law. Expenses above such amount will be borne by the Corporation.

- At this time, the Plan provides that dividends on the stock in a participant's account will be reinvested in Comsat stock for his or her account.

- Normally, the stock allocated to a participant's account each year will be distributed to the participant seven years after the allocation is made. However, the stock in a participant's account will be distributed in full upon his or her retirement, death, total and permanent disability or termination of employment for any reason.

- The participant's right to receive the stock in his or her account cannot be forfeited for any reason. The participant will be entitled to direct the voting by the Trustee of that stock.

- Under present Federal Income Tax Laws, the stock allocated to a participant's account and dividends, if any, paid on that stock and which are received and reinvested by the Trustee will not be taxable to the participant until the stock is actually distributed.

Funds for purchasing the shares for the employees will derive from a provision of the Federal Income Tax Laws that permits a corporation to claim an additional investment tax credit for this purpose annually through 1980. Subject to obtaining a favorable ruling on the Plan from the Internal Revenue Service, the Corporation will make contributions to the Plan for 1976 through 1980, and thereafter, if the law is further ex-

tended.

The foregoing is merely a summary of the Plan for general information. The terms of the Plan itself, which will control the operation of the Plan, will be provided in more detailed form at a later date.

### Worth Noting

**Irving Dostis**, formerly Manager, Radio Frequency, West Coast Office, has been appointed Director, Technical and Operational Planning. Mr. Dostis will be responsible for all operational planning including all aspects of the introduction of new technology associated with INTELSAT V.

**Brenda Lister**, Training Administrator, Personnel, attended a special meeting for the American Society for Training and Development held at the White House recently. Ms. Lister is a member of the Board of Directors of the ASTD professional society. The subject of the meeting, one of a series held at the White House with key officials of the Federal Government and other national leaders on important matters of national interest, was "Human Resource Development in the World of Work."

**Ulycia R. Powell**, formerly with the Missouri Division of Employment Security, has been appointed Administrator, Human Resources, for COMSAT. As a Member of the Assistant Director of Personnel's staff, Ms. Powell will have primary responsibility for the implementation of Corporate training programs.

### It's not Halloween without a pumpkin



Shr-Mei Wang, Edna Henderson, Bob George, Mabel Vandergriff and Carolyn Cunningham (left to right) with their creation in the Computer Room.

PHOTO BY ALLAN GALFUND

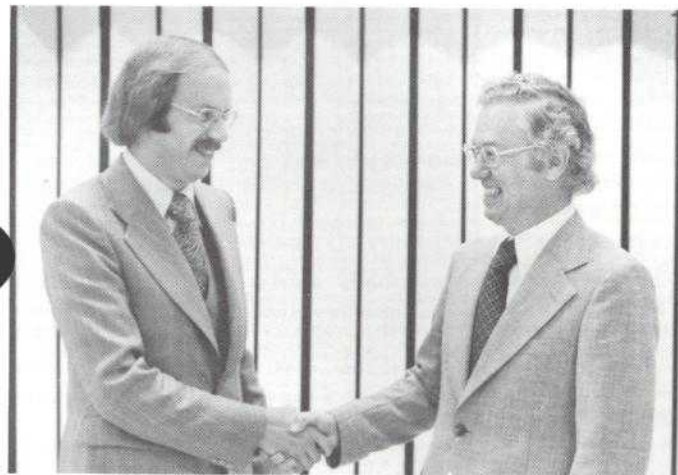
# Dahlgren and Russell transfer laterally in Personnel Office reorganization

BY MEL WILLIAMS

The recent reorganization of the Personnel Division was the result of the desire "to broaden and strengthen the staff and to permit more effective utilization of their respective talents," according to David S. Nye, Director of Personnel.

Lynford O. Russell has been transferred from the COMSAT Labs to Headquarters and is now Manager, Staffing and Personnel Services. Russell was graduated from the University of Chicago in 1958 with a major in Po-

litical Science. He also attended Graduate Business School at the University of Chicago while working as an associate administrative officer for the University. Since that time he has been employed by Operations Research, Inc., as Director of Personnel, and Applied Physics Laboratory (APL), as a Personnel Representative and Contract Representative. He left APL in 1968 to become Personnel Manager for COMSAT Laboratories and served in that position until being transferred.



*Personnel staffers Bob Dahlgren, left, and Lyn Russell wish each other the "best" on their exchange of positions. Dahlgren moved to the Labs while Russell came into the Headquarters office.*

In his new position he is responsible for the management of exempt and non-exempt recruiting and staffing, personnel services, and safety and health. James R. Dunn, Staffing Administrator, Melvin Williams, Personnel Services Administrator, and Nancy Dougherty, Safety and Health Officer, report to Russell.

Robert A. Dahlgren has been transferred to the COMSAT Labs and is Manager of Personnel Services for Research and Engineering. He is a graduate of Luther College in Decorah, Iowa, majoring in Business Administration and Psychology. After receiving his degree in 1968 he began his employment with COMSAT, concentrating on compensation and benefits administration.

In his new assignment he is responsible for the administration of the salary program for Research and Engineering, the administration of benefits for Labs employees, Research and Engineering recruiting and staffing, and employee counseling at the Labs.

Donald J. Chontos has been designated Manager, Compensation and Benefits. He was graduated from the

University of Dayton in 1957 with a degree in Industrial Management. After graduation, Chontos worked in the areas of pensions, retirement and group insurance prior to joining COMSAT in 1969 as Manager of Benefits. Until his current assignment, he worked in the areas of administration and benefits. Presently, he is responsible for the management of salary administration programs and for long range benefit program planning; i.e., improvements, changes, new programs and the direction of benefits in general. Moseetta W. Blackmon, Job Analyst, reports to Chontos.

William B. Lockett will continue to head the Equal Employment Opportunity and Human Resources Development function as Assistant Director. Lockett received his B.S. degree from Howard University in Washington, D.C., in 1962. Prior to joining COMSAT in 1969, he served as a manpower development specialist with the U.S. Department of Labor. He is responsible for overseeing and directing the Corporation's equal employment opportunity and training, development and education programs, and for administering the company's employee complaint, disciplinary and performance review procedures. Brenda Lister, Senior Training Administrator, and Ulycia Powell, Training Administrator, report to Lockett.



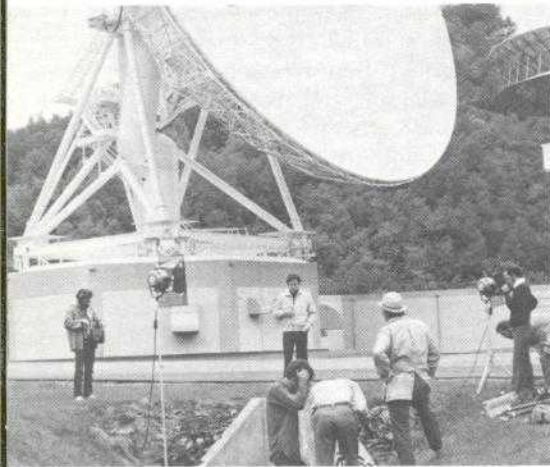
*A combination farewell party and reception was held at the Labs for Personnel's Russell and Dahlgren.*

## Star Trek hero "Captain Kirk" films sequence at Etam

By JAMES T. MCKENNA

William Shatner, widely known as Captain Kirk of the *Enterprise* in the TV series "Star Trek," was filming sites from Canada to Argentina for the production of a 90-minute documentary called "Mysteries of the Gods." The film, narrated by Shatner, deals with UFOs and extra-terrestrial life.

The Hemisphere production company requested permission to use the Etam earth station in the concluding scene of the documentary; COMSAT agreed and a filming schedule was set.



William Shatner, star of the TV show "Star Trek," center, uses Etam's 105-foot antenna as the background for the closing narration of the 90-minute documentary entitled "Mysteries of the Gods," a film about UFO's and extraterrestrial life to be seen in theaters around the country.

I joined the Hemisphere film crew at National Airport which, at the time, was being buffeted by thunderstorms and high winds. I was introduced to "Captain Kirk" on board the aircraft. He was very pleasant but appeared engrossed in a stack of papers containing his script for the documentary.

One of the few times Shatner took his eyes off the script was during our final approach to the Clarkesburg, West Virginia, airport in heavy rain and with minimum visibility. The pilot told us we would be through the

thick clouds and on the ground within two minutes. As the plane descended to about 1,000 feet we could hardly see the ground, but assumed we were landing with the aid of radar. Suddenly we heard the landing gear go back up, saw the wing flaps go back down. Then the plane pulled up and headed off to the right—a missed approach.

The pilot explained that the weather was worse than originally anticipated and a different approach to the airport with a refined radar system would be used. If all went well—or for that matter, if it didn't—we would be on the ground in about two minutes. If we had been tired and bored with the rainy weather, the flight changed all that—very fast. True to his promise, the captain had us safely on solid ground within two minutes.

As we drove to the motel, Shatner was studying his lines, often out loud for emphasis. After an hour's drive through fog and pounding rain, we reached our motel.

The Etam site with its pastures and peaceful surroundings made an ideal location for what the producer wanted to convey to his audience. The Etam area in the motion picture documentary is used to represent an area in mid-America which normally would not have any connection with outer space. The star, William Shatner, strolls around Etam reciting his thoughts about the possibility of UFOs on earth and the existence of extraterrestrial life based on the facts and evidence presented earlier in the film. At the end of Shatner's soliloquy the camera pulls back from the actor, revealing the huge antenna as Shatner closes with "What you have seen is not science fiction."

After five hours of filming the scene from different angles, the location shooting for "Mysteries of the Gods" was complete. The crew extended words of appreciation to the Etam personnel and were off to catch a flight back to Washington.

As we twisted and turned on the mountain roads, Shatner studied a new script for another motion picture which he was to start filming the next morning in Toronto, Canada.

**BREWSTER.** Congratulations to **Richard Attwood, Darrel Nelson, Bob Sanderson** and **Imogene Cook** on their tenth anniversary with COMSAT. Regretfully, the anniversary also included the retirement of **Jean Cook** after having completed her 10 years of service with COMSAT. Jean came to work at the Brewster Station in September 1966 as Personnel/Accounting clerk, becoming Station Administrator in March 1970. Jean, or "Mama Cook," as she was affectionately known to the staff, will be missed by all here at the station.



Jean Cook receives watch from Darrel Nelson as husband Bill looks on.

A retirement party was held for Jean at the Elks Club in Omak. She was presented a gold pendant watch, golf balls and a ball retriever from station personnel. She was also given a pocket calculator by the General Telephone personnel at the Brewster Station. —**Dorothy Buckingham**

**ETAM.** The Preston County Buckwheat Festival was again a huge success. We had pleasant weather and a majority of station personnel joined the thousands of visitors who turned out to enjoy the event. **Roger Parson** served buckwheat cakes and sausage for the benefit of the Oakland, Maryland, High School Band; **Lynn Rector** did the same for the benefit of the Church of the Latter Day Saints; and **Paul Helfgott** sold barbecued chicken for the Kingwood Jaycees. A high point of the festivities was the crowning of the Buckwheat Queen (a previous queen had been crowned by COMSAT's **Dr. Charyk**).

Recovering from a broken leg, **Chet Randolph** is back at work. Although he is limping, his spirits have not been dampened. **Mike O'Hara, Rupe Hobbs** and **Paul Helfgott** recently received their 10-year awards.

Vacation travel has practically come

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*Mr. McKenna is a COMSAT Information Officer.*

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## Network Bits

to a standstill. Your columnist and husband recently toured the New England states with a side trip to Atlantic City, New Jersey. Although very beautiful, fall is not the time of the year for "warm-blooded" people to travel north—with winds of 40 miles per hour and temperatures as low as 12 degrees. A journey south would be more desirable.

With open season on deer coinciding with Thanksgiving Week, some of our nimrods made forays into the woods adjacent to the station in hopes of stocking their freezers with fresh meat.

—Bev Conner



**JAMESBURG.** William D. Hamilton, pictured above right, receives his 10-year Service Award and Dr. Charyk's letter of Congratulations from Station Manager John P. Scroggs. Bill was initially employed as an Electronic Technician at the Andover Earth Station and transferred to Jamesburg in June 1973. Since joining the Jamesburg staff, Bill has advanced to Operations Supervisor. In addition, the Hamilton family has grown, with a son, David, added and another child (hopefully a girl) expected.

—Warren Neu

**SOUTHBURY.** Congratulations to Communications Technician Frank Makray and his new bride Josephine on their recent marriage. Our best wishes to Marc Gordon and family on his promotion and their transfer to Washington, D.C. Marc, who has been with us since December 1974, will be reporting to COMSAT GENERAL'S John Van Alstyne.

Station Manager Dave Durand is keeping fit and trim jogging daily in the crisp morning air (while fending off barking dogs). We hear he and his wife Joan regularly play a mean game of badminton.

Our annual Christmas Party will be held at the famous old Curtis House in Woodbury. We at Southbury would like to take this opportunity to wish every one a Merry Christmas and a Happy New Year.

—Eileen Jacobsen

**PLAZA.** Wanda Mills, George Lawler's secretary, turned in a wrap-up on United Way activities for use in the Plaza column. Since I see no way to improve on Wanda's report (nor would I be so vain as to try), I decided I would just turn over a portion of my column to Wanda, so here goes.

The contests, which were conducted during the United Way Campaign, generated a lot of interest at the Plaza. Some were fun (such as the Weigh-in and Bean-guessing), some were tasty (the bake sales), and some were rewarding (the drawing, garage sale, plant and quilt raffles).

Doris Babcock was the expert at the United Weigh-in, coming within a few pounds of the total weight of all the contestants, and almost winning in one of the other categories. Her prize—two tickets to the Christmas Dance donated by the CEA. Irv Goldstein won two shares contributed by the Credit Union for second place. Len Dooley won the macramé plant hanger designed and contributed by Tish Fonda. Other winners were Judy Holmes and Donna Higgs. As for the contestants, they were chosen for their avoirdupois (or lack of same), and, in particular, for their sense of humor—Joe Kearns and Ed Wabnitz were a team who billed themselves as Laurel and Hardy. Other contestant teams included Diane Franks and Rock Mattos, Wanda Mills and Jack Rutter, Tish Fonda and Paul Troutman, and Pat Irby and George Lawler.

Jim Potts won the bean-guessing contest hands down. He estimated the total number of beans in the pot at 4,090; the actual count was 4,083. How close can you get! Rumor has it Jim is a "professional bean counter," having won similar contests before. His prize is a box for eight at a Capital Centre sports event. Coming in second within 13 beans of the actual total was Hans Weiss.

Marion Timmons and her many

helpers conducted a most successful bake sale on two consecutive days, raising \$532.63 for the uw. The cookies, pies and cakes were delicious and beautifully displayed in the COMSAT Lobby. Winners of the raffle were Mary Lane, Sy Lynn and Maria Jackson.

A. C. Walle proved a great collector for the Garage Sale and George Lawler, a very efficient auctioneer. Items auctioned off were contributed by COMSAT employees. The Hanging Plant raffle was conducted by Michelle Fleurant with the winners Chet Hall, Judy Geary and Rita Carter. Pat Kearnan had the good fortune to have her pledge card drawn from among those submitted the first week of the drive winning an extra two days vacation.

Climaxing the uw activities was the extremely successful Wine-Cheese Party/Fashion Show planned and produced by Jack Rutter with the help of DeDe Runfola, Jen Baldwin, Joan Wright, Gail Chase and Phyllis Rhoe. The very fashionable models were Pat Irby, Cindy Rice, Joan Wright, Rosa Stone, Dick McBride, Jack O'Connell, Vernon Brown and Ed Snyder. The lovely quilt, designed and contributed by Jen Baldwin, was won by Dick Granger. The beautifully made knitted ensemble presented by Mary Huggett was won by Rosemarie Haines.

Sy Lynn contributed toward making the morning coffee breaks more pleasant by placing doughnuts at coffee urns throughout the building.

Wanda's contribution, together with the uw photo spread in this issue should certainly give the reader an idea of the tremendous effort put forth by Corporation employees in support of the uw. Our appreciation goes out to all of those who worked so hard to make this year's campaign a success.

Lou McKeague has departed Washington to join SBS in California. One advantage of the transfer is that Lou will be considerably closer to his Hawaiian homeland. Rosemary Davis, secretary to Assistant V.P. D. V. Neill for the past eight years, retired in November. Congratulations to John and Cathy Talcott on the recent birth of their sixth child, Steven James, eight pounds and nine ounces.

—Gloria Lipfert

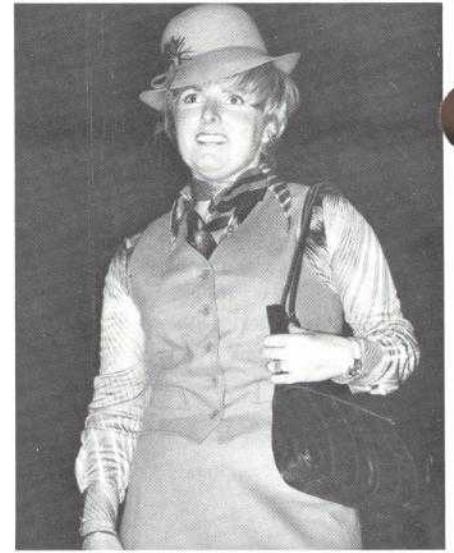
**Fashions for the Fashionable . . .**



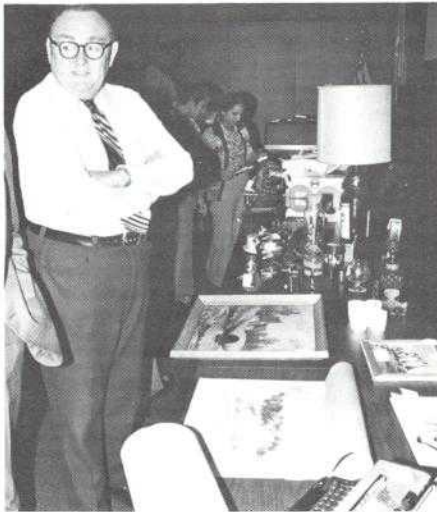
*Rosa Stone*



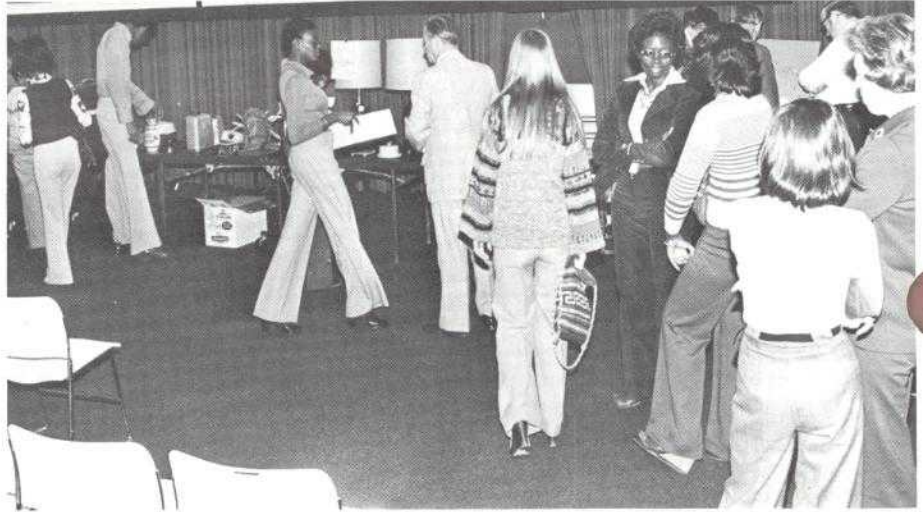
*Ed Snyder*



*Joan Wright*



*Howard Regan looks over merchandise for sale.*



*Typical employee turnout during UW activities.*



*Music was provided at UW activities by Les Cameron on flute, Don Flora with banjo, Beth Corry at piano and Paul Maughan on bass violin.*

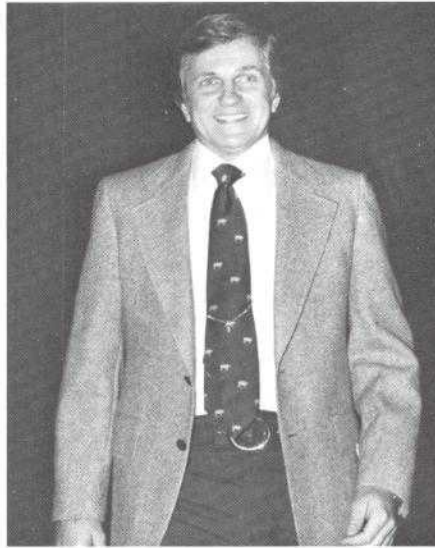


*Marion Timmons, Gail Chase, Doris Lee and Meryl Rosen left to right, assist cake sale customers.*

*for the United Way*



Pat Irby



Dick McBride



Cindy Rice

**1976 United Way Summary**

|                                  |                    |
|----------------------------------|--------------------|
| Percentage of participation      | 44.3%              |
| Employee contributions           | \$30,502.75        |
| Corporate contributions (base)   | \$15,000.00        |
| Matching corporate contributions | \$ 655.50          |
| <b>TOTAL</b>                     | <b>\$46,158.25</b> |

PHOTOS BY ALLAN GALFUND



Clarence Holoman "spills the beans" at the bean-guessing table.



Micheline Fleurant and Johann Sebastian Bach.

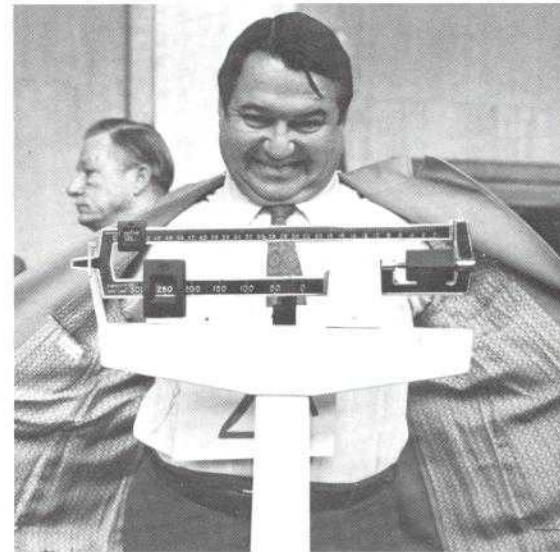
These figures represent an 8.5 percent increase in employee participation and a 2.7 percent increase in the amount of employee contributions. Figures cited here were provided by George A. Lawler, UW Co-Chairman.



Harry Evans (right) guesses the weight of Ed Wabnitz.



UW Co-Chairman/Auctioneer George Lawler at the Garage Sale.



"Hey Harry, ya' missed!"

# Season's Greetings



INTELSAT V  
SERIES OF  
SATELLITES

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