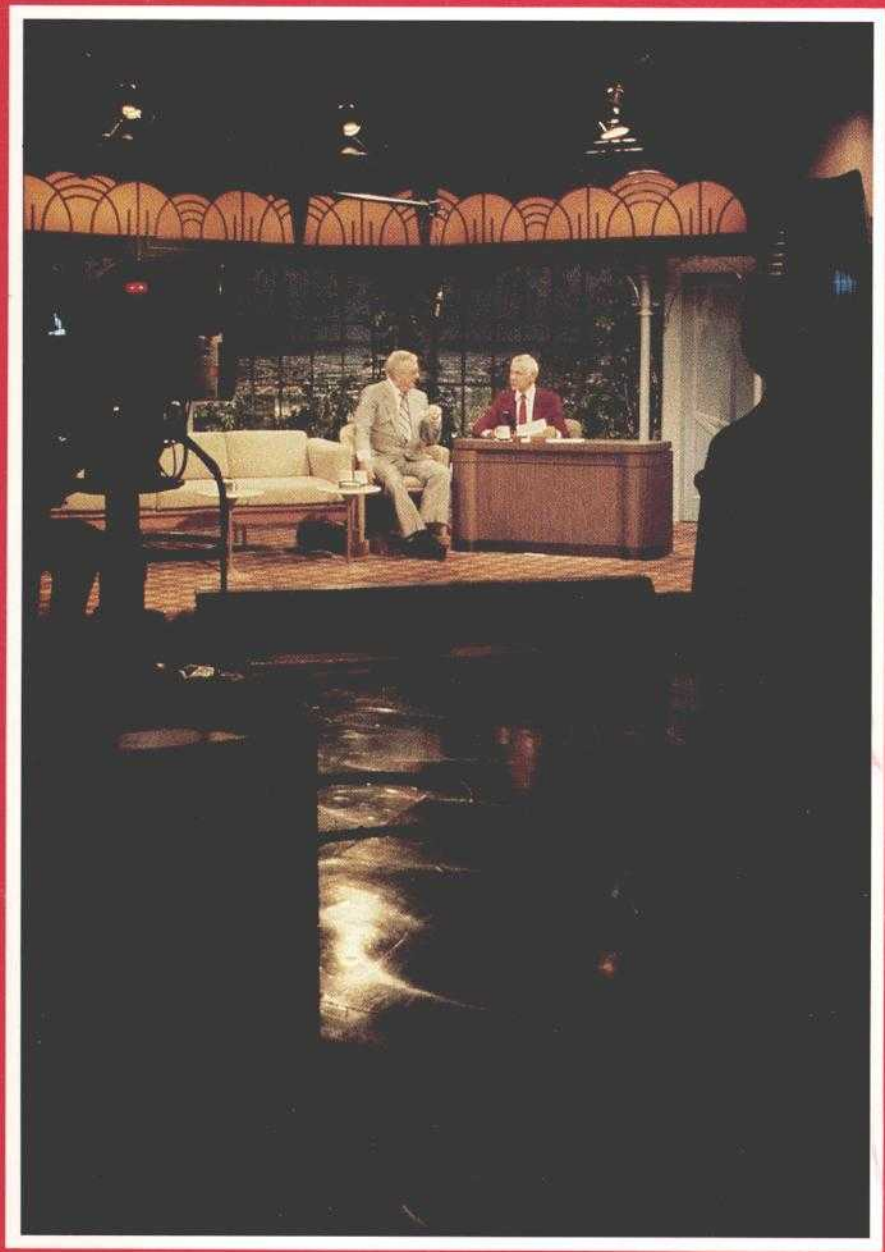
COMSAT

COMMUNICATIONS SATELLITE CORPORATION MAGAZINE

1984



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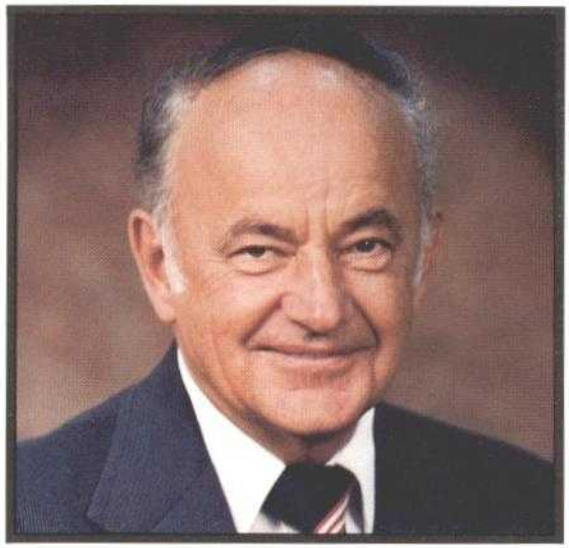

by **Dr. Joseph V. Charyk**
Chairman and Chief Executive Officer
Communications Satellite Corporation

As this is being written, a team of Comsat General engineers is hard at work supervising the creation of a system of over 180 earth stations on the premises of NBC and its affiliates throughout the country. When the system is completed and fully operational in early 1985, it will be the only fully dedicated, internally controlled broadcast distribution system in use by a major U.S. television network.

We at Comsat are extremely pleased at the confidence shown by NBC in Comsat General Corporation, our oldest wholly owned subsidiary, and we take pride in the fact that a part of Comsat is once again breaking new ground in the field of communications. For Comsat General, creation of the Comsat General/NBC Distribution System is only the latest in a record of achievement that includes the Comstar domestic satellite communications system, the Marisat system for maritime communications, and many significant consulting contracts with telecommunications entities in 40 different countries.

The Comsat General/NBC Distribution System is innovative, not just in terms of technology, but from a business standpoint. For it is the intention of both Comsat General and NBC to use spare capacity in the system to offer communication services and thus to afford all involved, including NBC's many affiliate television stations, the opportunity to earn additional revenue from it.

What we are doing in creating the system is significant from the broadest possible perspective. In the early days of the satellite communications business, the logical emphasis was on creating capacity in space, that is, on launching and operating satellites. The need for satellite communications was clear, but what was lacking were sufficient satellite transponders to meet that need. Today satellite capacity is not the problem it once was. Indeed we are threatened with the possibility of a capacity glut.

What is lacking are the systems on the ground and services making use of those systems that will bring the benefits of the technology to the largest number of people possible. By building the Comsat General/NBC Distribution System with its 180 fixed earth stations and its fleet of transportable earth stations as well, we are providing nearly all of the population centers of the United States with the opportunity to link with a single nationwide system. That system will be in use every hour of every day serving NBC but what else we do with it will be limited only by our ability to analyze market forces and to harness them through the creation of imaginative, saleable services.

COMSAT

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Articles in Comsat Magazine reflect the authors' opinions, which may not necessarily be those of Comsat. Permission to reprint articles may be obtained by writing the Editor. Correspondence should be addressed to Stephen A. Saft, Editor, Comsat Magazine, Communications Satellite Corporation, 950 L'Enfant Plaza, S.W., Washington, D.C. 20024.

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Cover: Johnny Carson and Ed McMahon on the set of "The Tonight Show Starring Johnny Carson." Thanks to the satellite system Comsat General Corporation is building for use by NBC, dedicated satellite transmission will be the principal way that NBC Network shows like "Johnny Carson" reach NBC owned and operated television stations and NBC affiliates. The picture was taken by Chief Photographer William J. Megna with permission from Johnny Carson. For more on the Comsat General/NBC Distribution System and on Comsat General itself, see the coverage beginning on page 8.

From the Editor

How do the member stations in a television network get their programs? In pursuit of a better understanding of network distribution today and how Comsat General Corporation is changing all that through its work with NBC in developing the Comsat General/NBC Distribution System, we traveled widely, touching down at five NBC affiliate locations, the two principal locations where NBC Network programs are originated—NBC headquarters in New York City and NBC Studios in Burbank, California—and at the headquarters of Harris Corp., in Melbourne, Florida, Comsat General's principal contractor. We hope that at least some of what we learned in our travels comes through loud and clear in the words and pictures that start on page 8.

So many people at NBC and the five NBC affiliates we visited as well as at Harris Corp. and at **Comsat General** itself helped us, and, unfortunately, we have space to recognize only a fraction of them here. At NBC-New York, our deepest thanks to Michael J. Sherlock for agreeing to be our guest author and to Don Kivell and Jeff Given. At NBC-Burbank, thanks to Joe Bleeden and to Johnny Carson, who permitted Chief Photographer William J. Megna to photograph him while his show was in progress.

At the NBC affiliates we visited, these people were especially helpful to us: Reid Carpenter of KUTV, Salt Lake City; Jack Varnier of WGEM, Quincy; W.T. McGill of KTSM, El Paso; Claire Anne Holmberg and Jack Davis of KFYR-TV, Bismarck; and Stan Stifflar of KCNC-TV, Denver. At Harris Corp., our thanks to Dan Ozley and Janiene Joyce. Finally, but hardly last when it comes to the gratitude we feel, our thanks to these members of the Comsat General staff: Robert Kinzie, William L. Mayo, Frederick (Fritz) Hofmann, Richard (Dick) McBride, and Debra Collier.

We are very pleased to be able to publish once again the Comsat World Systems Division rendition of the map of the Intelsat Global System. It appears in the center of the magazine. Our thanks to Dixie Berg of **Comsat**'s Office of Corporate Affairs for all her work on the map.

Stephen A. Saft

AT PRESS TIME

FCC takes action concerning ownership of earth stations, direct access, structure and allocation, business services

At an open meeting on March 30, 1984, the Federal Communications Commission (FCC) took a number of actions on matters of major concern respecting the Corporation's future activities and business. At press time, our information was based on public statements made at the Commission meeting and on subsequent FCC press releases.

Earth Station Ownership

The Commission issued a Notice of Proposed Rulemaking in which it proposed modifying its policy on the ownership of U.S. earth stations accessing the Intelsat system to permit individual carriers to own and operate these facilities. Applications for earth stations to provide international business services and television services would be routinely granted pursuant to this new policy, whereas applications for multipurpose stations would be subject to somewhat closer scrutiny to ensure that their authorization did not have an adverse effect on the efficiency of the overall earth station network. With respect to the future of the ESOC (Earth Station Ownership Consortium) arrangement, the Commission proposed affording the ESOC partners an opportunity to work out their own solution or solutions, which would be presented to the FCC for its review and approval at the end of a specified negotiating period. The Corporation expects this negotiating period to commence following a definitive Commission Order this fall. The Commission also stated that it would require **Comsat** to establish unbundled rates for earth and space segment services. Finally, the Commission tentatively concluded that existing and future Comsat earth stations should be placed in a separate subsidiary, outside of World Systems Division, which would provide competitive earth station services.

Direct Access

In August 1982, the Commission began an inquiry to determine whether carriers other than **Comsat** should be permitted to access directly the Intelsat space segment. In its Report and Order, adopted on April 2, the Commission weighed the perceived benefits and drawbacks of the various direct access proposals before it, rejected all such proposals and terminated the proceeding. Thus, **Comsat** remains the sole U.S. investor in the global satellite system.

Corporate Structure and Cost Allocation

In another Report and Order, the Commission reaffirmed its earlier tentative conclusions that there are no legal or policy bars to **Comsat**'s engaging in non-Intelsat and non-Inmarsat related activities, and that the structural safeguards voluntarily put into place by **Comsat** to separate its jurisdictional and non-jurisdictional activities were satisfactory. However, the Commission also indicated that the formulas currently used by **Comsat** to allocate general and administrative (G&A) and research and development (R&D) costs between jurisdictional and non-jurisdictional activities should be revised to more accurately reflect costs incurred at **Comsat** in managing these activities. With respect to G&A expenses, the FCC prescribed the use of a cash expense formula, not based on property or revenues, for allocating those expenses; cash expenses are all operating expenses except depreciation. G&A capital cost allocation will be based on use. Therefore, computer costs will be based on percentage of time; headquarters' costs will be apportioned by percentage of space used. R&D expenses and capital costs also will be allocated on a cash expense basis. The Common Carrier Bureau estimated that the cost-allocation revisions, when implemented through new tariffs required to be filed by mid-June, would result in a reduction in **Comsat**'s overall rates of about 5 to 10 percent.

International Business Services

The Commission approved **Comsat**'s participation in **Intelsat**'s International Business Services (IBS) program, as well as **Comsat**'s application for an IBS earth station at Staten Island, New York. In a related item, it granted similar applications by International Relay, Inc. (IRI), for IBS earth stations in New York City and Chicago, Illinois.

N O T E S

Operating revenues in 1983 show a 7.5 percent increase

For the year ended December 31, 1983, **Comsat**'s operating revenues reached a new high of $440.4 million, an increase of 7.5 percent, or $30.9 million, over the amount reported for 1982. This increase is principally a result of growth in revenues for the Corporation's international communications satellite services and for its equipment manufacturing business. Operating income for the year 1983 totaled $107.7 million, an increase of $3.9 million over the amount of 1982.

Comsat's Consolidated Net Income for 1983 was $50.1 million, an increase of 15.6 percent or $6.7 million, over 1982. The 1983 primary earnings per share was $2.77 on approximately 18 million shares outstanding, compared to $2.70 per primary share on about 16 million shares outstanding in 1982.

The increase in net income is attributable primarily to higher revenues from the services **Comsat** provides through the Intelsat system; from the sale of most of the Corporation's wholly owned computer-aided-engineering subsidiary, CGIS; and from the sale of the Corporation's investment in the common stock of Ungermann-Bass, Inc. These increases were partially offset by an increase in its share of the losses from the Corporation's partnership interest in Satellite Business Systems (**SBS**), as well as one-time expenses associated with the Corporation's cost reduction program, including employee severance and early retirement payments.

After recognizing federal income tax benefits, investment tax credits and the elimination of intercompany transactions, **Comsat**'s share of losses from its partnership interest in **SBS** increased to $24.0 million in 1983 from $16.0 million in 1982.

Comsat Operating Revenues for the fourth quarter were $107.7 million, a decrease of $2.8 million compared to the amount for the same period for 1982. This decrease primarily reflects reduced revenues from the Corporation's Comstar satellites as well as reduced revenues that resulted from the sale of most of the Corporation's CAE subsidiary, CGIS, in September 1983. Operating income for this period decreased by $1.6 million compared to that for the last quarter of 1982.

Consolidated Net Income for the fourth quarter of 1983 was $8.7 million, or 47 cents per primary share, a decrease of $2.5 million, or 22 cents per primary share, compared to that for the corresponding period of 1982. The major factors contributing to this decrease in the fourth quarter of 1983 were increased losses from **SBS** and lower investment tax credits. The Corporation's share of losses from its partnership interest in **SBS**, after recognizing federal income tax benefits, investment tax credits and the elimination of intercompany transactions, increased by $4.8 million in the fourth quarter of 1983 compared to that for the same period in 1982.

Intelsat Governors approve two for new senior positions

At its first meeting of 1984, the Intelsat Board of Governors made a number of decisions. The Board:

- approved the appointments of Mr. Jose L. Alegrett of Venezuela to the position of Deputy Director General, Business Planning and External Relations, and Mr. David Tudge of the U.K. to the position of Deputy Director General, Finance and Staff Support Services. Mr. Alegrett, who has served as Director of External Relations at **Intelsat** since 1977, began his involvement with **Intelsat** as Venezuelan Representative in the negotiations of the Intelsat Agreements. Mr. Tudge served most recently as Treasurer of British Telecom International, having been with that organization (formerly the Post Office) since 1965.
- approved measures to streamline Board operations and, to that end, delegated to the Director General authority in a number of areas.
- approved the purchase of Ariane 4 launch vehicle services from Arianespace for the launch of one Intelsat VI spacecraft.
- decided to deploy the recently launched Intelsat V (F-8) at 307°E to provide Business Services and other leased services.

Continued next page

N O T E S

• approved in principle the provision of non-preemptible television lease service on operational satellites as part of an ongoing effort to identify and refine new services. Tariff considerations will be taken up at the next meeting.
• approved the lease of capacity for domestic communications to Israel (three 14/11 gigahertz spot beam transponders) and Chile (18 megahertz of global beam capacity).
• decided to amend the negotiated lease agreement with **Inmarsat** due to noise problems being experienced on certain Maritime Communications System payloads and to provide for an Intelsat V Maritime Communications System in the Pacific Ocean region by December 31, 1985, or earlier, if so requested by **Inmarsat**.
• requested the Director General to send a letter to **Inmarsat** indicating that **Intelsat** is prepared to enter into exploratory discussions over the provision of second generation maritime capacity.

Two Comsat officers retire; other news of Comsat officers

Two senior officials of the Corporation have now retired: Carl J. Reber, formerly Senior Vice President, and Dr. John V. Harrington, formerly Senior Vice President, Research and Development, and Director, **Comsat Laboratories**. From 1981 until 1983, Mr. Reber served as Senior Vice President, Finance, and Chief Financial Officer. From 1980 to 1981, he was Senior Vice President, Finance, and from 1978 to 1980, Vice President, Finance.

"The contributions of Carl Reber and John Harrington have had a significant impact on **Comsat**'s development and growth," said Dr. Joseph V. Charyk, Chairman and Chief Executive Officer, in commenting on the retirement of both men. Dr. Charyk continued, "In **Comsat**'s earliest days, Carl Reber was instrumental in building the financial framework for the Intelsat network, one that continues to operate effectively two decades after its development. More recently, his talents and experience have helped assure **Comsat**'s financial strength and growth. Under John Harrington's leadership, **Comsat**'s research and development activities have led the way to numerous technological achievements and innovations. His vision and skills have played a significant role in bringing to all the benefits of satellite communications. Both men have given **Comsat** a strong foundation upon which to build our future successes."

William M. Karnes, formerly Treasurer of the Corporation, has been elected Comptroller, replacing George L. Skinner, who has decided to retire. Reporting to Mr. Karnes is Richard L. Dineley, who has been promoted to the post of Assistant Comptroller. Daniel F. Thomas, formerly Treasurer of Satellite Business Systems (**SBS**), has been named Assistant Treasurer of **Comsat**.

Lawrence M. DeVore, formerly Vice President and General Counsel, has been appointed to the newly created post of Vice President, Law and Administration, Comsat World Systems Division. In his new post, Mr. DeVore continues to serve as General Counsel of the Division and, in addition, is responsible for the management of the Division's activities associated with financial analysis and budgeting, rates and tariffs, and general administrative matters.

Several changes involving senior positions at Comsat General Corporation have been announced. William L. Mayo, formerly Vice President, Satellite Systems Group, is now Executive Vice President. Mr. Mayo retains his responsibility for Satellite Systems, and, in addition, Kenneth Manning, Vice President, Communications Services, and Leo Keane, Chief Scientist, now report to him. (Mr. Keane comes to **Comsat General** after a stint with Satellite Television Corporation.)

W. Coleman Guthrie becomes Vice President, Systems Technology Services, at **Comsat General**, replacing William D. Houser, who has accepted a position outside the Company.

Robert (Ted) Johnson, formerly Senior Director, Contracts and Procurement, becomes Assistant Vice President, Contracts and Administration, Comsat General Corporation.

Three new senior positions within the Comsat Technology Products (CTP) organization have been created and have

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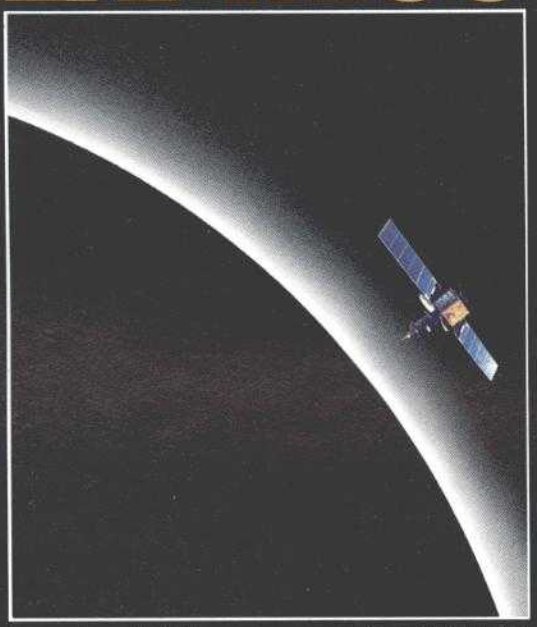
DIGITAL EXPRESS



Since 1965 when commercial satellite communications were first introduced, **Comsat** has been at the forefront in bringing new applications and communications services to its international carrier customers. Digital communications has been the subject of substantial research and development efforts at **Comsat**, and much progress has been achieved in finding reliable and economical methods for using digital transmissions to meet the requirements of a vast array of end users—large corporations, government agencies, and multi-national service organizations.

Now **Comsat**'s World Systems Division, following extensive work with its international partners in **Intelsat**, is proceeding with commercial, fully flexible digital satellite services designed to meet the communications requirements of today's multifaceted organizations.

In establishing the design criteria of this digital satellite offering, called Digital Express, **Comsat** determined that existing offerings did not satisfy several new and emerging needs for international satellite services. Among the needs met by Digital Express is wide connectivity from the U.S. West Coast to Europe via a single satellite hop. By making it possible to use existing stations, antennas in urban areas, and antennas on end user's premises, **Comsat** enables its customers to find new and expanded business opportunities in the international sphere.

Comsat's Digital Express is an all digital offering with channel speeds ranging from 64 kilobits per second (kbps) to 1.544 or 2.048 megabits per second (Mbps) for transmitting digitized voice, high speed computer-to-computer information, compressed video for videoconferencing and other related applications.

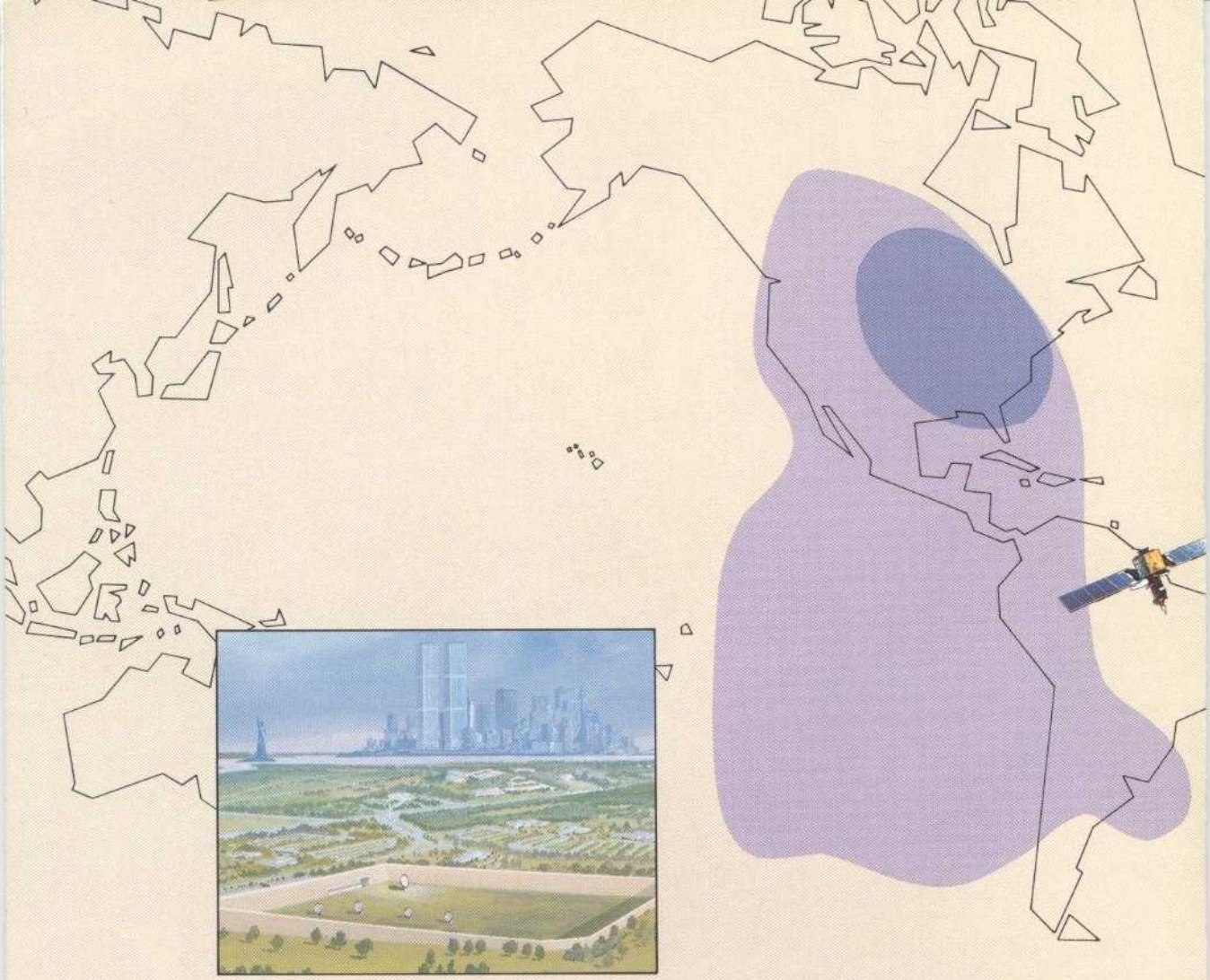
Comsat's World Systems Division believes this innovative satellite service is responsive to the current and emerging needs of the international communications marketplace. The multinational commmunications user will find the service brings new flexibility to the provision of international services.

Initially, Digital Express will be offered in the Atlantic region through a satellite which will provide coverage of the 48 contiguous states and most of Europe and Africa. Coverage to Central and South America also will be provided, and eventually all major international business centers may be accessed from the United States through **Comsat**'s Digital Express service.

Comsat plans to offer Digital Express from a variety of earth stations, including the new Teleport on New York's Staten Island and at the Corporation's primary international access centers in Etam, West Virginia; Andover, Maine; and Roaring Creek, Pennsylvania. Small (3.5

by **James T. McKenna,**
Assistant Director, Government Marketing, Comsat World Systems Division.

NEW FROM WORLD SYSTEMS



to 7.5 meter) earth stations on or near customers' premises also can be utilized to facilitate the transmission and reception of Digital Express service to points around the world.

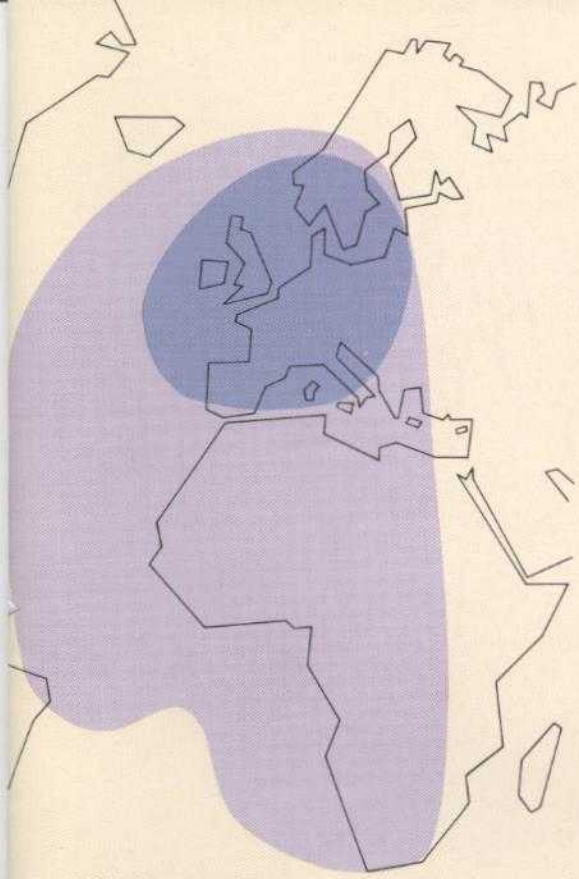
The variety of applications which may utilize Digital Express should prove attractive to organizations that, in the past, could not economically obtain the necessary terrestrial lines to access international satellite facilities. Since this new satellite service is all digital, it serves a wide range of applications which includes digitized voice, high speed data and—at the 1.544 Mbps level—compressed video for teleconferencing.

Digital Express also was designed to minimize the problems associated with frequency clearances in congested areas. By utilizing the far less congested Ku-Band, in addition to the traditional satellite C-Band, installations closer to major metropolitan areas are practical.

Services will be offered full-time, part-time or on an occasional-use basis. The new part-time and occasional-use options should increase the attractiveness of **Comsat**'s international satellite services for government agencies and business organizations with medium size or temporary communications requirements.

Digital Express also minimizes, if not totally eliminates, the customer's requirement for long terrestrial circuits and adds to the security and performance of communications circuits due to the variety of earth station locations available, including customer premises and urban teleport access points. An end user could, for example, extend a domestic satellite network internationally through **Comsat**'s access centers in Pennsylvania, West Virginia, Maine and the planned Staten Island, New York, Teleport complex.

Applications for Digital Express are as flexible as the customer demands. For example, a magazine publisher might use Digital Express for the transmission of copy, page proofs, or actual film facsimiles for printing international editions



IBSS Coverage
Atlantic Ocean Region

Ku-Band Spots

C-Band Hemisphere

of magazines and newspapers. When a facsimile circuit is not being used for the transmission of news pages, it can be used for carrying digitized voice to coordinate and handle operational or administrative matters. A Digital Express circuit used for voice might be used during off-peak hours to move high-volume data from one area of the world to another.

While the most economical utilization of Digital Express to and from the United States will be through Intelsat Standard A, B or C antennas, Digital Express offers customers an opportunity to utilize small earth station antennas ranging in size from approximately three to nine meters on end user premises.

Antennas which are smaller than the 11-30 meter class that have traditionally operated with the Intelsat system, such as the Ku-Band Standard E (3.5-7.7 meters) and the C-Band Standard F (5.5-9.7 meters), will be charged a rate inversely proportional to the size of the antenna. For example, a 3.5 meter antenna would have a higher charge than a 7 meter antenna, since the smaller the earth station the less efficient is its utilization of the space segment.

The sharing of earth stations also is an option for Digital Express customers. Two or three organizations may choose to aggregrate their communications requirements in a single location. An example of shared use through an urban access center is the Staten Island Teleport earth station serving New York City and Northern New Jersey, proposed by **Comsat**'s World Systems Division.

Comsat is offering Digital Express service, as it does all World Systems international services, to international communications carriers authorized by the Federal Communications Commission. Comsat World Systems Division's Digital Express service is offered on a full-time (24 hour-a-day basis), on contractual basis (specific number of hours per week) or on an occasional-use basis, whereby a customer reserves an amount of time as small as one half hour.

Digital Express is not designed to replace **Comsat**'s traditional international services, which today, it is estimated, are providing two out of three transoceanic telephone calls and all live intercontinental television, but rather to expand to private networks the Corporation's customer base for all digital services. Traditional telephone service and private line circuits from the U.S. to countries not serviced by Digital Express will continue to be provided by **Comsat** through the Corporation's facilities on the East and West Coasts of the United States. Digital Express is designed to provide added network flexibility to take advantage of today's digital technology in providing the best possible multi-national service to communications users.

Through Digital Express and the other versions of the new Intelsat Business Service (IBS) offering, the Intelsat system again is at the forefront of providing a service which improves productivity and efficiency in doing business in today's highly competitive society.

Additional information on Digital Express services can be obtained from the Business Development Division of **Comsat**'s World Systems Organization at 950 L'Enfant Plaza, S.W., Washington, D.C. 20024, Tel: (202) 863-6229.

Map indicates areas of coverage in C and Ku Bands for Comsat's new Digital Express service. Inset is an artist's rendering of new Teleport being built on Staten Island; antenna in rear would be operated by Comsat to provide Digital Express service to entire New York City area.

COMSAT GENERAL *on the move*

In 1976, Comsat General Corporation was responsible for five separate satellite launches that heralded the successful start of two satellite communications systems—the Marisat system for ships and offshore platforms and the Comstar system for domestic telephone communications. It was an extremely busy and exciting year for this wholly owned subsidiary of the Communications Satellite Corporation, which had been organized just three years earlier to handle **Comsat**'s non-jurisdictional satellite communication businesses.

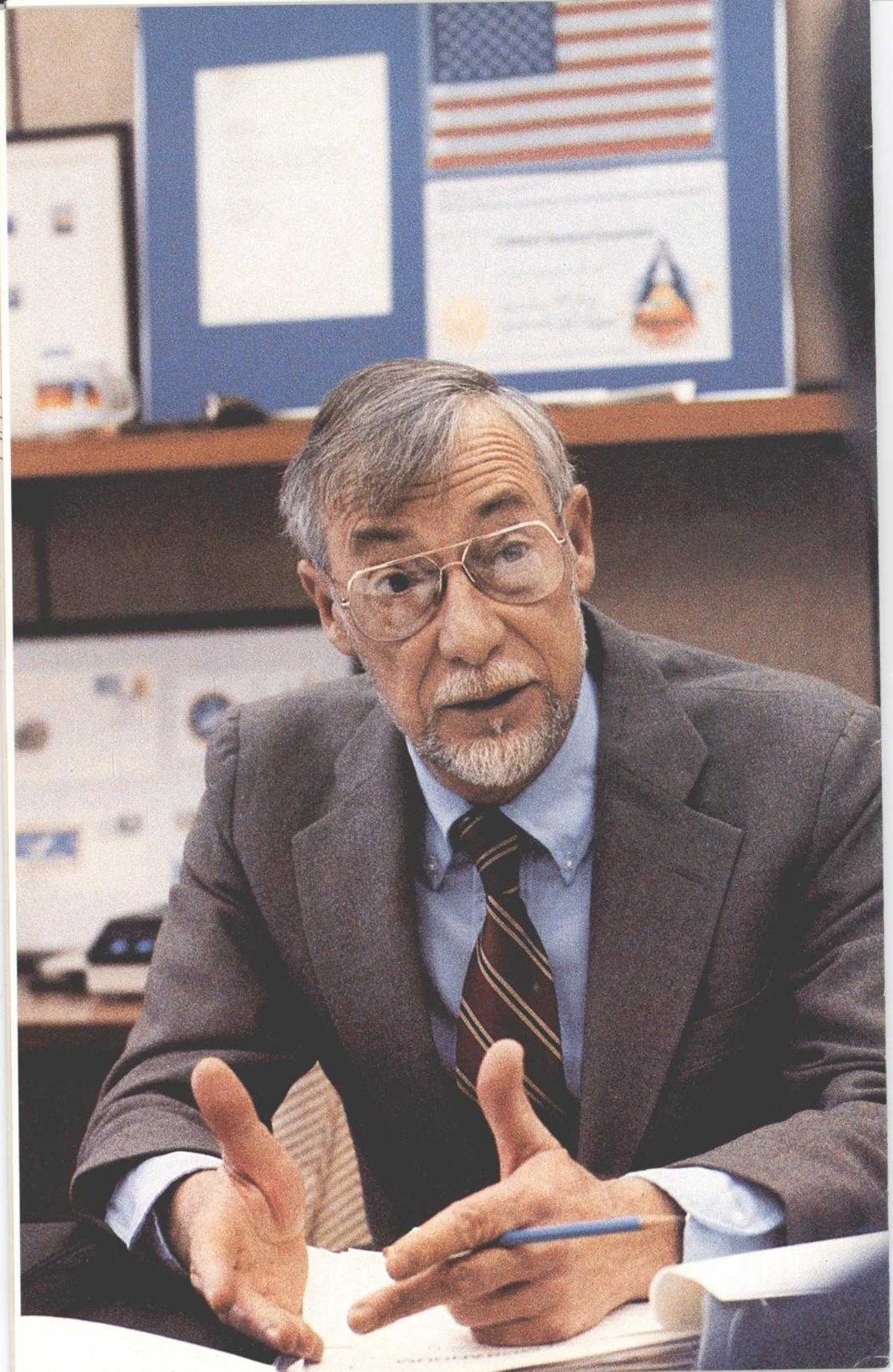
"Extremely busy and exciting" are the appropriate words to describe the year 1976 in the history of Comsat General Corporation, but, as the pages that follow help to make clear, they may be an understatement when one attempts to capture in words what is happening now. For, having substantially broadened its mission, Comsat General Corporation is moving into a future bright with promise, a future in which it will provide many more communications and engineering services to many more customers and clients than ever before.

Recently, this leading communications engineering organization signed contract renewals for both the Marisat and Comstar systems, earning still more revenue for these highly successful satellite systems. At approximately the same time that these contracts were being signed, officials of the subsidiary were putting their names to yet another contract, this one with the NBC Television Network for creation of a dedicated Ku-Band system that will encompass over 180 earth stations and be used for the distribution of all NBC Network programming to all NBC-owned and NBC-affiliated stations and general business communications services as well. The 10-year contract with NBC, valued at at least $220 million, is resulting in the establishment of earth stations in approximately 95 percent of the population centers in the United States.

Comsat General engineers are hard at work bringing the dedicated NBC system into being and will have it fully operational in early 1985. Meanwhile, other Comsat General colleagues are involved in numerous projects utilizing their extensive knowledge of design, construction and operation of satellite communication systems and their expertise in handling satellite launch operations. And still more are at work developing innovative business communication services to be offered over the Comsat General/NBC system and other leased-service private networks for governmental and commercial customers as well as specialized systems for mobile and emergency applications.

Thus these are times jam packed with activity for Comsat General Corporation, and that's the reason that we say, "**Comsat General** is on the move."

One of the six transportable earth stations built for Comsat General by Harris Corp. for dedicated use by NBC parked at L'Enfant Plaza, Washington, D.C., home of both Comsat and Comsat General. Foldable antenna measures 5 meters. Trailer is 42 feet long.



An Interview With ROBERT KINZIE

by **Stephen A. Saft**, *Editor, Comsat Magazine.*
Photography by ***William J. Megna,*** *Chief Photographer.*

The chief executive of Comsat General Corporation describes the major changes that are taking place in the telecommunications industry and how Comsat General has positioned itself to keep itself strong.

Robert W. Kinzie, President of Comsat General Corporation, sits in his office and talks about how the telecommunications business has changed in the 22 years he has been involved with it. "The whole business is acting like the calculator business about 10 years ago," he says. "What we're seeing is a drastic increase in function coupled with significant reductions in price. When you couple these developments with the moves away from regulation and toward competition, as is happening in the United States, you come up with an industry that is radically different from what it was some years ago. The only absolute in the industry is cumulative change."

Kinzie, who assumed his present job in October of 1982 but whose career with **Comsat** started in 1965 after four years with the Federal Communications Commission, was asked his views for presentation in this special section of **Comsat Magazine**.

"For a long time," Kinzie, who is a businessman trained as an attorney, statistician and economist, continued, "the industry was controlled by embedded technology with the state of the art changing in step functions. The industry was segmented on the basis of format identification; that is, if you carried voice, you were a voice carrier; if you carried record, you were a record carrier. Today what used to be solved through mechanical means is simply solved by the computer chip and software, so a bit becomes a bit becomes a bit.

"All the basic equipment has now been developed and is being refined to show the bit in any form the communications user wants—as voice, as record, as facsimile, as data, as voice and image combined, which is television. The technical innovations are coming in the form of compression and multiplication techniques, which, as in the situation with calculators in the past, are driving prices down and functions up."

As a result of changes like these, Kinzie points out, some of the advantages enjoyed by the leaders in the telecommunications business have been erased, and competition has increased enormously. "Entry is cheap," Kinzie stated. "Anyone with an office and a word processing machine can devise a business plan and a filing and lever those with venture capital. Everyone with a communications facility or even a circuit is basically in competition. They can all carry the bit or the signal. It may well be that anyone with business or traffic to carry is a carrier."

In such a world, there are several dangers for the telecommunications company, Kinzie asserted. "One is the danger of building businesses around technological solutions looking for a problem," he said. "We can do almost anything technologically, but does the customer need it enough to use it for a reasonably long term and to pay enough to produce a profit for the company providing the service? The customer and the user don't care what technology you utilize. The customer doesn't care whether the picture or the signal comes through the water pipe. The user is only interested in reliable, low cost communications that fit a need.

"A danger which every telecommunications company must avoid," Kinzie continued, "is a situation where the technical solutions come so fast we lead users into systems that are too complicated or which embed them in equipment that is like the dinosaur because price and function are changing so fast. This can be very easy to do when entry to the marketplace is inexpensive. Quality communications for quality customers who want to sleep at night cannot be provided on a quick-fix basis.

"The ability to rent a word processor, crank out a business plan, make a filing, and get venture capital," Kinzie added, "does not replace the need for solid and responsible managing, testing, and provision of reliable service. A teleconferencing system or an in-plant phone system that is so complicated, and not sufficiently tested, that it requires a team of engineers standing by constantly tweaking knobs or patching and kludging does not help the industry or the customer.

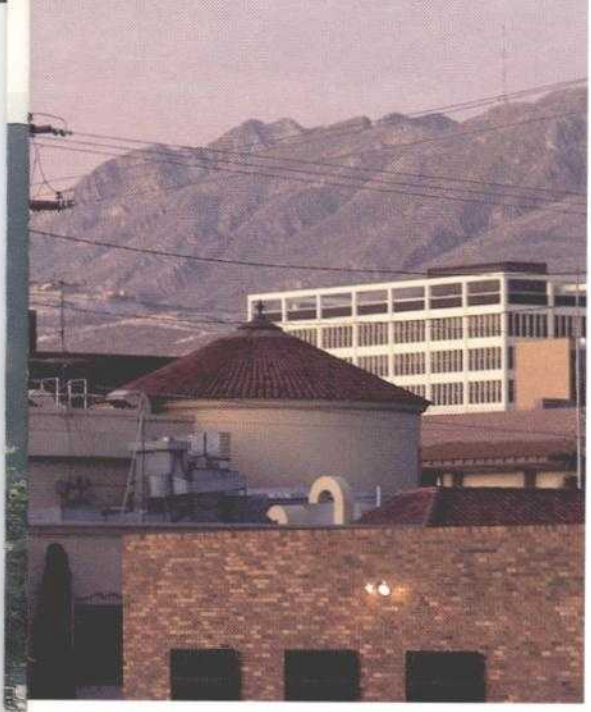
"Thus, while we have a responsibility both to the industry and to the user to bring the new technologies to the market as rapidly as possible," Kinzie stated, "we also have a responsibility to provide reliable communications and not to burden the user with facilities or services that do not meet his requirements or are not flexible enough to be adaptive to changing requirements.

"For 17 years," Kinzie noted, "I have heard about the wonders of being able to transmit the entire *Encyclopaedia Britannica* in five minutes and the information in the British Museum in 10 minutes. Unfortunately, very very few customers need, nor can they pay for, a system that transmits that much information that quickly. Even if you find a customer, that leaves a lot of other five-minute slots to be sold during a year."

***Below,** Robert Kinzie, President, Comsat General Corporation. **Right,** Location is KTSM, NBC affiliate in El Paso, Texas. Antennas on roof of building are 6-meter primary, left, and 3-meter backup for the Comsat General/NBC Distribution System.*

Clearly, cumulative change is the most obvious characteristic of today's telecommunications industry. What must a company that wants to serve that industry do? Kinzie answers this way: "We are dealing in a commodity that is no longer bound by embedded technology or artificial segmenting of the market. The competition is getting rough; a lot of very smart and very good people are already in or are entering the field. Thus, marketing and selling are the key. By saying that marketing and selling are the key, I mean that we must take into consideration our technical strengths to determine what we can and should provide. But the main point is that we must determine what the customer really needs (and is willing to pay for) which we can provide profitably. Then we must provide it on a tested and reliable basis at the most competitive price."

What about **Comsat General**? What specifically is **Comsat General** doing to strengthen itself during these unsettled times? Kinzie responds, "Of the engineering companies with strength in the satellite communications business, we're the best in the world. The evidence is irrefutable in this regard. The record we've compiled in our consulting business and as the designer, construction supervisor and operator of the Comstar and Marisat satellite systems is simply impossible to beat. The reliability of those systems is fantastic.



"Using the same teams of people that have established such a record for us as our nucleus," Kinzie noted, "we're branching out. We're moving out so that we can position ourselves closer to the communications user. That means we're going to be selling services, not just systems. **Comsat General**, as well as **Comsat** itself, has been in the razor business when the significant profits have really been in making and selling the blades. In other words, we've been providing the communications pipeline, and doing a tremendous job doing it, but we haven't had enough to do with what has been going through the pipeline.

"Our contract with the NBC Network is the best example I can cite concerning the new direction in which we're moving, and it sets an important precedent for much of the other businesses we're going after," Kinzie continued. "We're creating a dedicated, flexible and economically efficient private communications system for NBC including all of its affiliates. We own the system, and NBC leases service from us for the 10 year life of the contract. At the same time, working with NBC-owned stations as well as NBC affiliates, which are privately owned television stations, we're developing a menu of business communications services that will make maximum use of the system. Both **Comsat General** and NBC have an opportunity to make a lot of additional money out of a system that will already provide the NBC organization with its own dedicated transmissions, a system that offers the benefits of total internal control through freedom from reliance on external terrestrial communication systems.

"One of the things we're convinced of is that once fully operational, the Comsat General/NBC system will be able to offer business services such as electronic document delivery and electronic mail, data transmission, teleseminars and video teleconferences at significantly lower cost and with much greater flexibility than has been possible up to now," Kinzie stated.

As for other near future projects for **Comsat General**, Kinzie says, "we're looking hard at the establishment of private networks to serve the communication needs of several private and governmental organizations resulting in much improved communication services at much lower cost. The decreasing costs and the enhanced security of a private—as opposed to a shared—network for transactional uses enhance the usefulness and marketability to customers. We also expect to be very active in linking domestic and international satellite communication services for the private user, and we expect to play a substantial role in the burgeoning field of mobile communications and in emergency communications as well.

Some key Comsat General staff (and one member of Harris Corp. staff) involved in working with NBC and affiliates in front of transportable earth station, from left: Lawrence Westerlund, Bill Davidson (Harris Corp. employee), Paul Palmiter, Frederick (Fritz) Hofmann, Christine Winder, Robert (Ted) Johnson, Alan Coburn, Robert Kinzie, Richard McBride, Barry Ross, and William Mayo.

"There's no question," Kinzie concluded, "that these are very exciting times for anyone in our business, and I am confident that **Comsat General** is positioned to be one of the winners as we move through the tough, shakeout years ahead."

The Comsat General NBC System:

Television Distribution Breakthrough

by **Michael J. Sherlock**,
Executive Vice President,
Operations and Technical Services,
National Broadcasting Company.
Photography by **William J. Megna**,
Chief Photographer, Comsat Magazine

Opting for the new dedicated satellite system, NBC is changing the way television pictures have been gathered and sent for nearly 40 years.

Back in 1945, Arthur C. Clarke, the noted science fiction writer, postulated that some day satellites would achieve worldwide communications. Today, satellites are carrying telephone calls, credit card and banking information, and television and radio broadcasts. Satellites, quite simply, have revolutionized American communications.

Yet another step forward in satellite technology was taken last fall when the NBC-TV network and **Comsat General** entered into an unprecedented agreement to develop the first satellite distribution system for network television using the higher, Ku-band frequencies.

The $220 million, 10-year arrangement between **Comsat** and NBC became a reality in January when an interim system, which distributes TV programming principally from network broadcast centers in New York and California to a selected group of 22 local NBC stations, began operation. The entire system of 181 ground stations should be operational in January 1985.

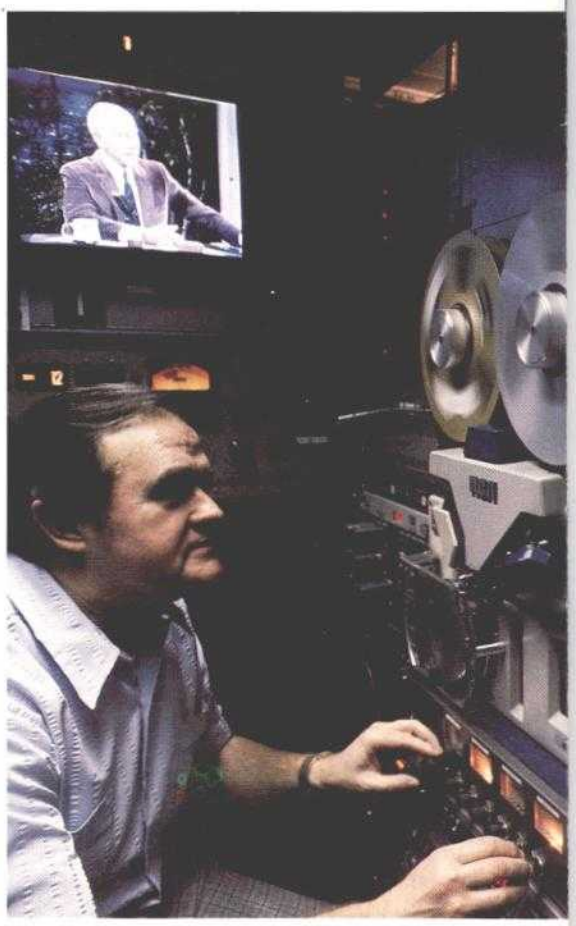
How big a deal is this? Very, very big. At NBC we are ending the way television pictures have been gathered and sent to local communities for nearly 40 years. **Comsat General**'s system will be our life-line to American homes.

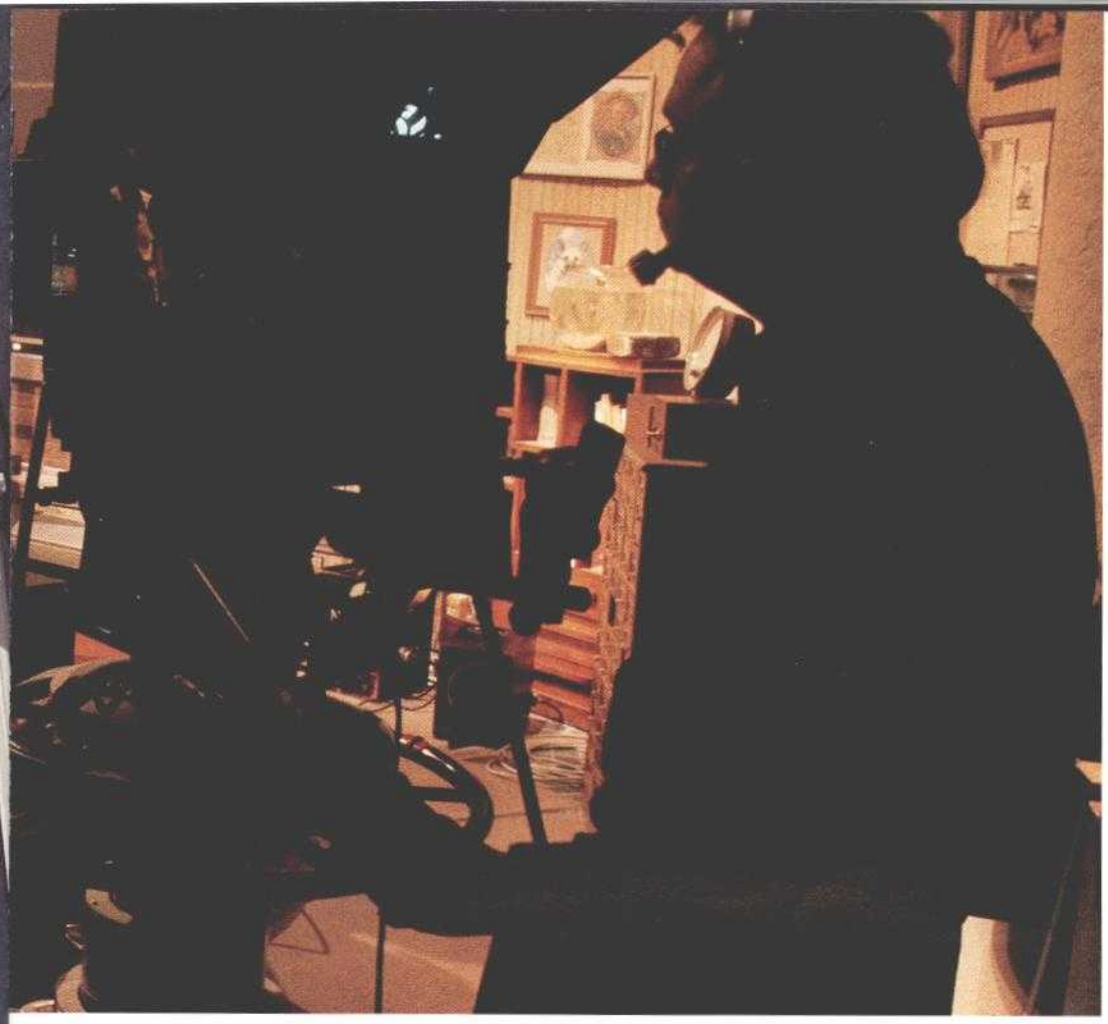

NBC 4

Previous Page, *On the set of Johnny Carson Show with Johnny and guest Ray Charles. Show is produced at NBC Studios, Burbank, California.* **Inset,** *Kiosk-like sign outside NBC Studios, Burbank.* **Below,** *Headquarters for NBC are at 30 Rockefeller Plaza, New York City.*

That's risky business. Here's why we are taking the risk. Like all broadcasters, NBC seeks the most efficient and economical means to distribute its network signal. Until recently, all of NBC's television programming was distributed through a combination of landlines and microwave relays. This may sound simple, but over the years it has become increasingly complicated. For instance, NBC uses a *separate* landline for *each* signal going in or out of our New York and Burbank, California, broadcasting centers.

Entertainment programs produced in California are sent to New York, then fed to the network—a group of 215 independently owned broadcasting stations around the country. News footage is received from all over the world, then fed back out to our affiliates. Sporting events are received from various locations, then distributed to others on a complicated scheme based on regional interest.



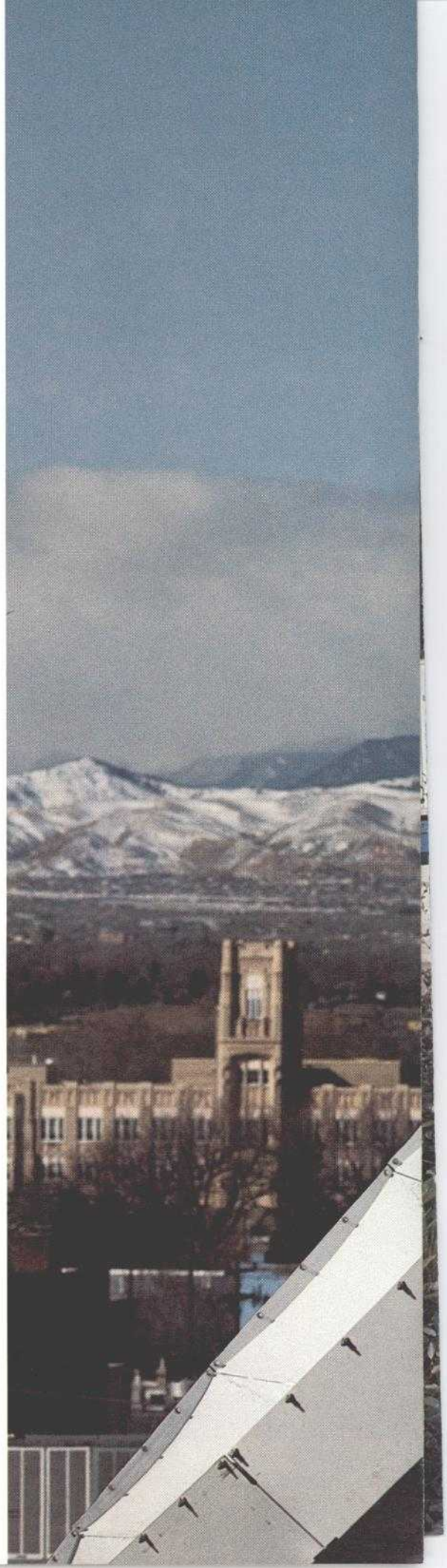


Left, *On the set of "Late Night With David Letterman" show, produced at NBC headquarters, New York City. Guest is Valri Bromfield.*

Above, *In the Skypath Room at NBC-New York, Central control and monitoring of the Satellite Network Management System (SNMS) for the Comsat General/NBC Distribution System takes place here and in a similar room at NBC-Burbank. The most critical job of the satellite system is the switching function—telling the electronic traffic where to go. Skypath computers are loaded daily with switching information for all of the 181 earth stations in the system. Shown are NBC engineers Stev Asay, left, and Robert J. Butler, Chief Engineer, Satellite Network.* **Left,** *Distribution of "The Tonight Show Starring Johnny Carson" to over 200 NBC-affiliated stations starts at this video-feed machine at NBC-Burbank. Broadcast engineer John Griffin operates machine.*

Above, *View of NBC affiliate KFYR-TV in Bismarck, North Dakota. Comsat General/NBC Distribution System antennas are two pointed upward to the left on roof of building, the 3-meter backup and 6-meter primary.* **Below,** *KFYR-TV station manager is Claire Anne Holmberg. Chief Engineer is Jack Davis.*

A television network is made up of hundreds of individual television stations across the length and breadth of the United States, many of which are independently owned. The independently owned stations are referred to as "affiliates." In preparing our coverage of the Comsat General/NBC Distribution System, we were fortunate to be able to have our Chief Photographer, William J. Megna, visit five separate NBC affiliates—KTSM in El Paso, Texas, KFYR in Bismarck, North Dakota, KCNC TV in Denver, Colorado, WGEM in Quincy, Illinois, and KUTV in Salt Lake City, Utah. Photographs taken at these affiliate stations are on this and the facing page and on pages 12, 20 and 21.



Keeping track of all this electronic traffic makes us a lot like a traffic cop standing in the middle of an extremely busy intersection, directing rush hour traffic coming from eight different directions—and directing it all by hand.

Once we get all the traffic moving in the right direction to our stations, it has to travel around the country on a "round robin" electronic highway made up of those landlines and microwave relays.

Like any other traveler, the farther from home the signal goes, the more "tired" and faded it gets. To television viewers that means the farther from New York they are on the round robin, the weaker the quality of picture they receive. And if they can't see the picture, they're not going to watch our programs. It's as simple as that.

So. There was our problem. In the 1980s, we had more and more complicated traffic to handle; we were vulnerable to picture quality problems. And if that weren't enough, rate uncertainty made landline transmission an iffy business proposition.

The answer to our three-part problem was satellite distribution through Comsat.

Take picture quality, for instance.

Below left, *W.T. McGill, Vice President & Chief Engineer, KTSM, El Paso, Texas, at earth station terminal at KTSM.* ***Below Right,*** *In the master control room at KCNC-TV, Denver, are Rex Leonard, Maintenance Technician, left, and Stan Stiffler, Crew Chief.*

Left, *The Rocky Mountains are in the background. In the foreground is the 6-meter primary antenna for the Comsat General/NBC Distribution System on the roof of KCNC-TV, NBC affiliate in Denver, Colorado.*

Above, *Ice had jammed the locks on the Mississippi River at Keokuk, Iowa, and a news crew from NBC affiliate WGEM, Quincy, Illinois, went to investigate. Tom Vodak, reporter, left. Jim Lawrence, cameraman, right.* **Below,** *WGEM and its two satellite dish antennas, left.*

Transmissions sent by satellite are superior in quality to those sent by landlines, because satellite signals require only one bounce off a satellite.

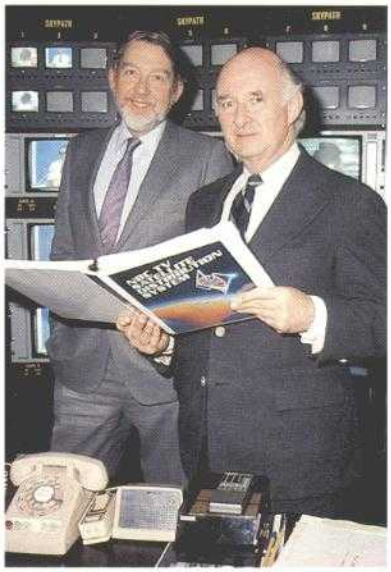
We also get improved traffic control. Our traffic cop has been replaced by R2D2. Only we call it the nationwide Satellite Network Management System (SNMS), jointly developed by **Comsat General** and NBC.

Central control and monitoring of the SNMS is located in a room called Skypath in New York and Burbank. The most critical job of NBC's satellite system is the switching function—telling the electronic traffic where to go. Skypath computers are loaded daily with switching information for all of the 181 earth stations. This information is contained in what we call the "Broadcast Routine," now prepared for New York and Burbank "Switching Central" to release programs to the network.

Additional traffic information will direct satellite feeds to take place among ground stations that do not involve Switching Central. For example, this could mean feeding a program segment from Atlanta to Chicago, bringing in a local sports program to an affiliate from a transportable station, or connecting two affiliates together to exchange news material.

Skypath also ensures that system troubles and affiliate questions are answered quickly. NBC's New York and Burbank Skypath centers, as well as **Comsat General** in Washington, D.C., receive system status reports every 10 seconds.

On news set, KUTV, Salt Lake City, Utah, on camera from left, Barry Nielson, Jon Stehr, and Randall Carlisle. ***Inset,*** *Reid Carpenter, right, Vice President & Director of Engineering, KUTV, reviews NBC Network support material on satellite distribution system with Harris Corp. engineer Jerry Demuri. In rear is KUTV earth station terminal.*



Above, Two key NBC people concerned with satellite distribution system are, from left, Donald W. Kivell, Director, Network Interconnection, and John J.P. Weir, Vice President, Broadcasting Operations. Below, An engineer demonstrates the operation of equipment inside transportable's control room.

Now for the really good part. Not only do we get better pictures via satellite. Not only do we get improved traffic control. We also get a very sound business proposition.

The satellite system provides the basis for new business opportunities for **Comsat**, NBC and our affiliates. We are putting together **Comsat**'s professional satellite system expertise with our own half-century of professional experience as electronic communicators. And we are doing that in every major market. Just imagine what that can mean for teleconferences, data transfers and all the other new video enterprises.

But finally, it's not the dream of a pie-in-the-sky that sold us on **Comsat**. It was **Comsat**'s down-to-earth reliability and commitment to service for our basic business—network television.

If we're not on the air, we're out of business. We picked **Comsat** because we're confident that **Comsat** can keep us on the air and in business—for a long time to come.

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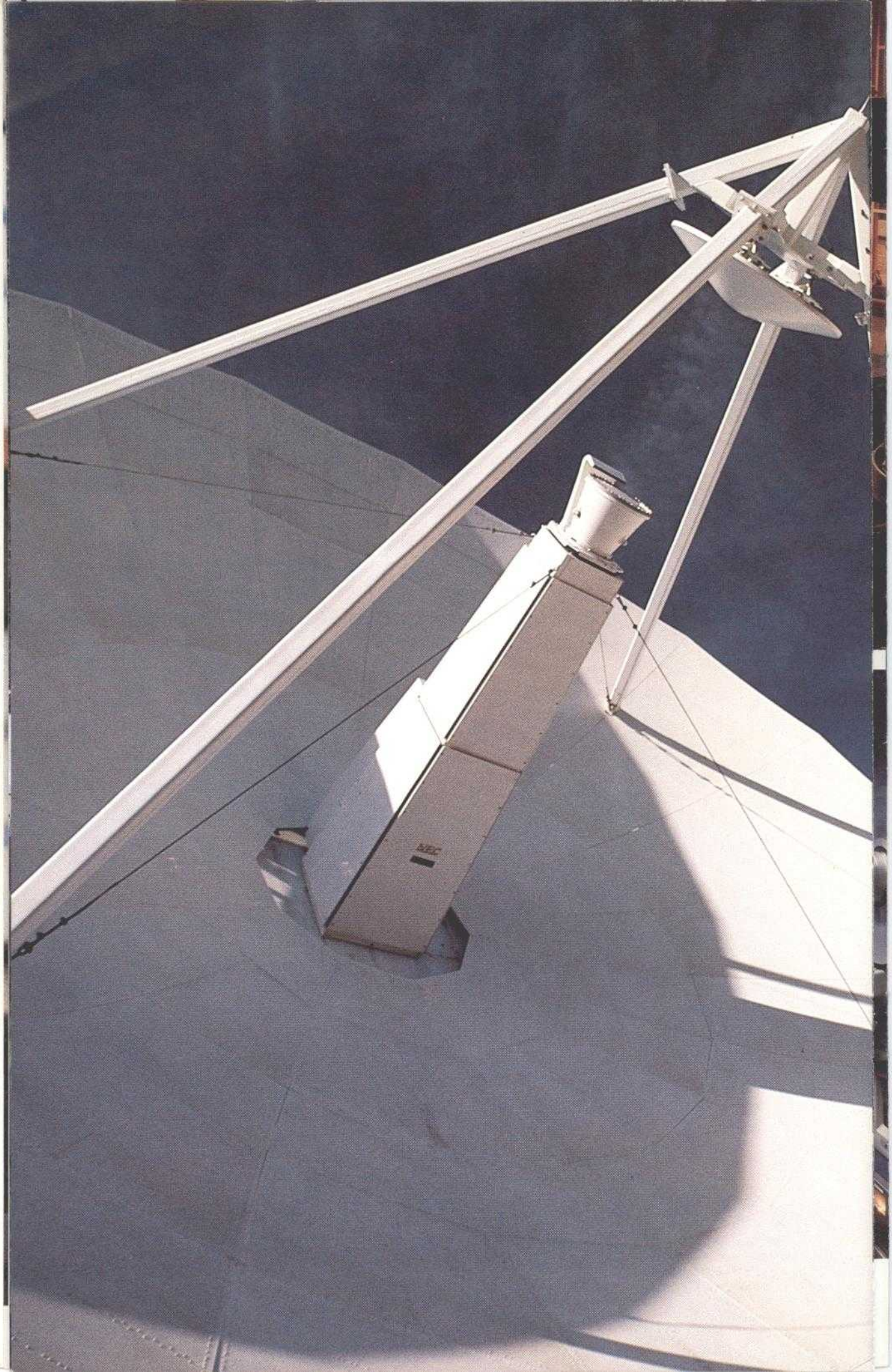
*Comsat General/NBC Distribution System transportable earth station with 5-meter dish antenna folded up ready for the road. **Inset,** When folded up, 5-meter transportable antenna looks like this. Photos were taken at headquarters of builder of transportable, Harris Corp., Melbourne, Florida.*



It All Started With COMSTAR

The program that put Comsat General squarely in the domestic satellite communications field was the highly successful Comstar program.

The creation of **Comsat General** almost a dozen years ago facilitated the entry into the domestic commercial field of a company already preeminent in the application of satellites to worldwide communication. This foresight to branch into commercial operations has been amply rewarded over the years, and prospects are brighter than ever for pursuing new ventures in the communications and related fields. We find ourselves today with some very successful programs behind us, and some exciting new ones to look forward to.

by ***William L. Mayo,***
Executive Vice President,
Comsat General Corporation.
Photography by ***William J. Megna,***
Chief Photographer, Comsat Magazine.

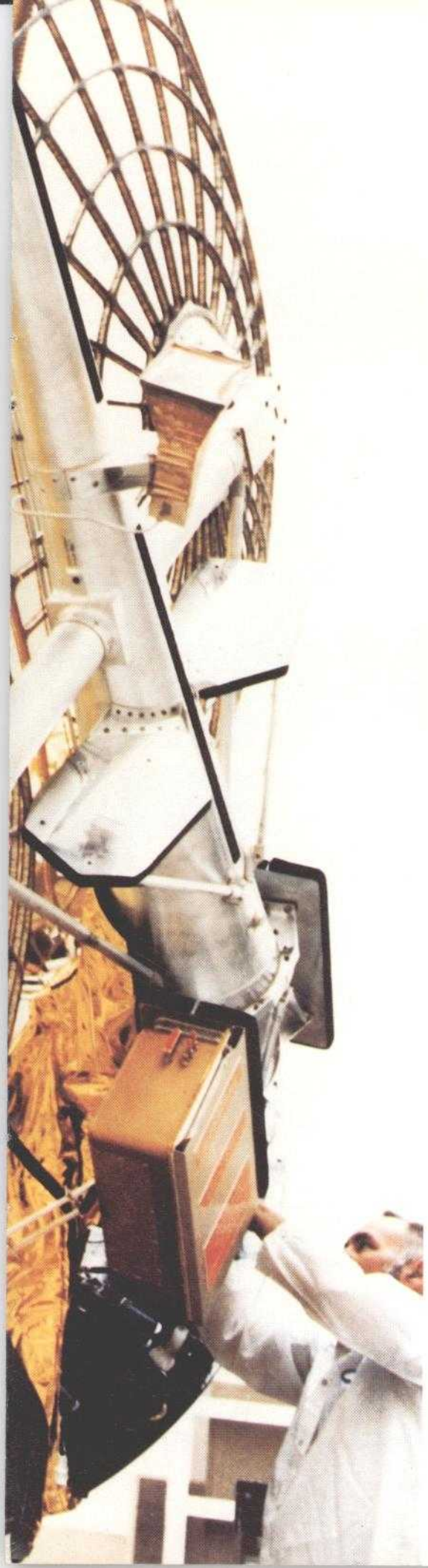
The program which put **Comsat General** squarely in the domestic communication satellite field was Comstar, a series of four satellites which provide voice, data, and television service between and among the continental United States, Alaska, Hawaii, and Puerto Rico. The Comstars were the first satellites to be integrated into the nation's long distance telephone network. Although the communication capacity of these satellites is leased entirely to commercial common carriers, the satellites were designed to specifications prepared by Comsat General Corporation; built for us and launched under our direction, and maintained in orbit by Comsat General people using Comsat General facilities. Each of the satellites has a design lifetime of seven years and can handle the equivalent of 18,000 simultaneous telephone conversations. The first two of these satellites were launched in 1976, and the third in 1978, to provide a complete domestic satellite communication network.

A unique feature of the satellite construction contract, calculated to insure the best efforts on the part of the spacecraft manufacturer, calls for incentives to be paid if the satellites exceed their design lifetimes and meet certain minimum performance requirements. It is noteworthy that within the past year, the initial three satellites have exceeded their design lifetimes and are earning incentives for their builder.

As the Comstar satellites near their expected lifetimes in orbit, there has been some reduction in their capability, a phenomenon predictable with fair accuracy. For this reason the first two Comstar satellites to be launched have been positioned very close together in orbit, and the load on each reduced by one-half, more than doubling their remaining lifetimes. To an earth station looking into space, they appear essentially as one satellite and are indeed operated as one. To provide the full capability of the initial system, the fourth and last Comstar satellite was launched into orbit in February 1981. The combination of four satellites will provide service for several years to come.

The Comsat General Marisat satellite program has been unique among communications satellites. On the one hand it has provided a dedicated UHF service for the United States Navy. On the other, it marked the beginning of a new era in ship-to-shore communication of unprecedented reliability and quality which

Opening Pages. *Two of the antennas at the Comsat General earth station in Santa Paula, California. Earth station performs telemetry, tracking, control and monitoring services for Comstar and Marisat satellites and carries Inmarsat and specialized Intelsat traffic.*



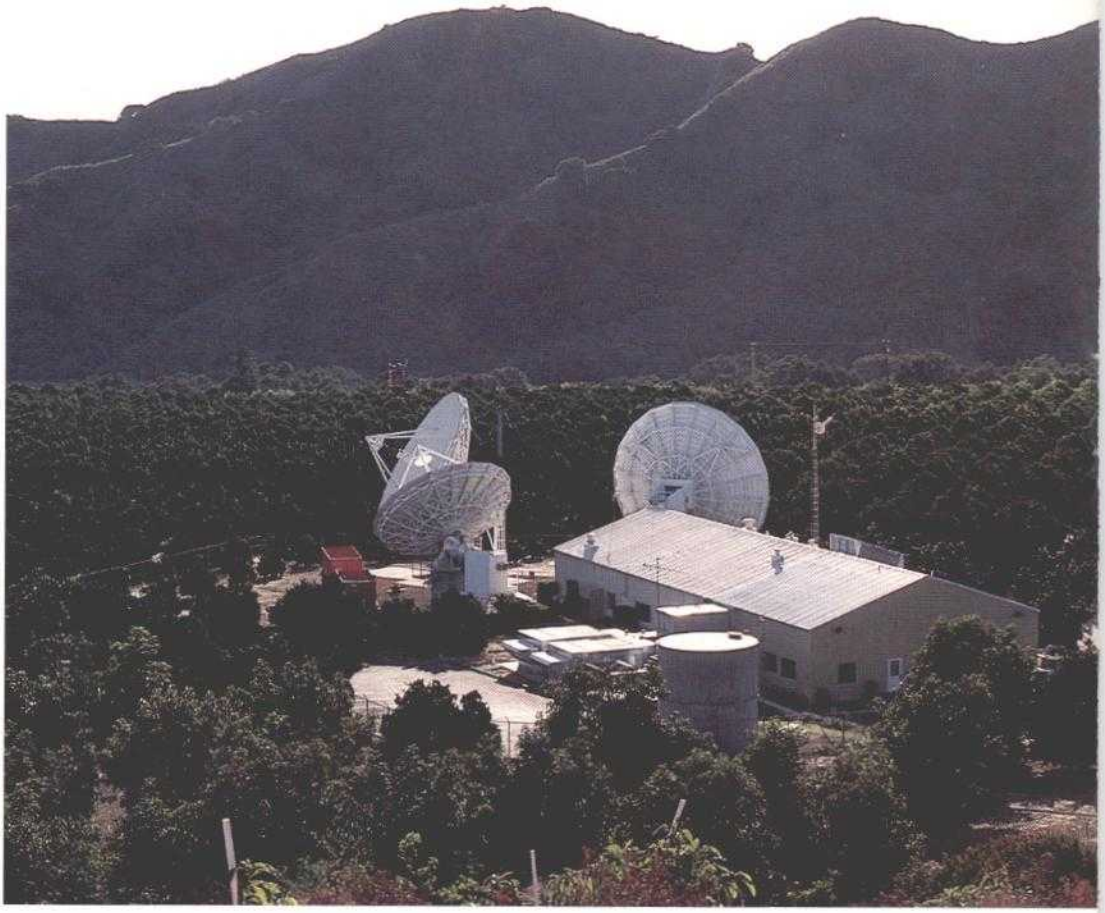
Left, View of Comstar satellite at plant of builder, Hughes Aircraft Co., El Segundo, California.

provides a degree of safety and operational control of vessels on the high seas that is not achievable by any other means. It is the unique hybrid nature of this satellite that permitted the United States Navy to acquire a UHF capability for much less than the cost of ownership of an entire satellite, while fostering the development of commercial maritime satellite communications, again at a cost far below that of a fully dedicated satellite system.

Unlike the Comstar system, which provides domestic U.S. communications, Marisat makes possible essentially worldwide communications from three satellites positioned above the Atlantic, Pacific, and Indian Oceans. Two of the three Marisat satellites were launched in 1976, and services include reliable, high-quality telephone, telex, facsimile and data communications. Through the magic of Direct Distance Dialing, a call from a ship at sea or an offshore platform to a point anywhere in the world is as simple as picking up a handset and dialing. Practically, the transmission is sent from a small antenna mounted high on the ship to the nearest Marisat satellite, and then down to a shore station. The early Marisat system used three shore stations, the Comsat General stations at Southbury, Connecticut, and Santa Paula, California, and a third at Yamaguchi, Japan. From one of these stations, the transmission would be sent over regular telephone lines to its destination. A caller anywhere in the world could reach a ship or platform by following the reverse procedure.

The Marisat concept, as created and developed by **Comsat General**, was so successful that on February 1, 1982, it became the nucleus of a new international organization, **Inmarsat**. **Inmarsat** has continued to develop and expand the system, adding more ship terminals, space capacity, and shore stations.

Service provided to the U.S. Navy falls in the UHF band. Unlike the Marisat service—for which **Comsat General** handles the interconnect between the space segment and the public switched telephone network—we provide only the space segment capacity to the Navy. This consists of one wideband and two narrowband channels on each of the three satellites, which the Navy may use as needed. Presently the U.S. Navy does not require all of the available UHF



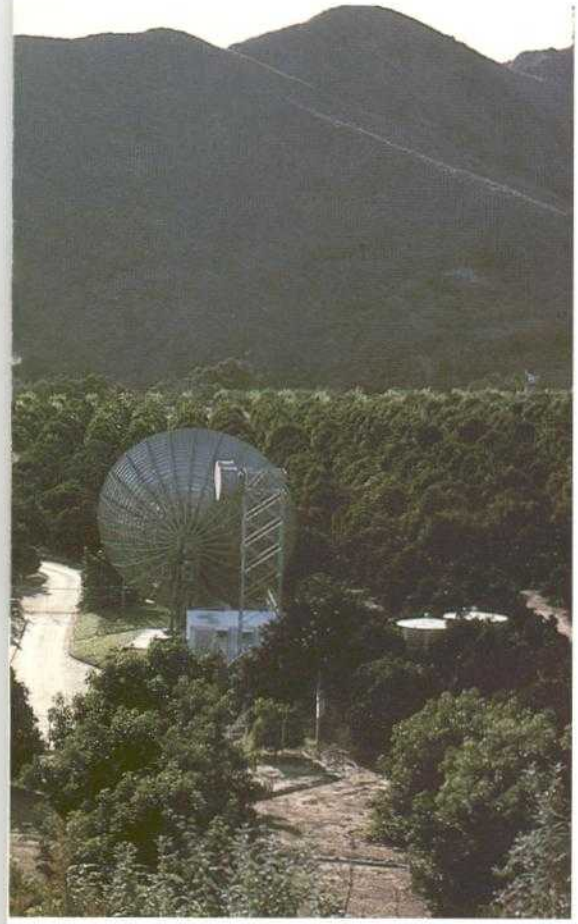
The Santa Paula earth station, about 50 miles northwest of Los Angeles and set right in the middle of an orange grove.

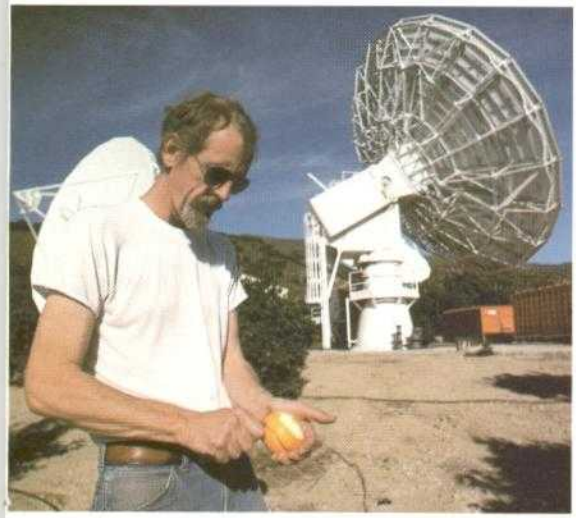
capacity, and we have leased one narrowband channel on the Atlantic region satellite to the United Kingdom Royal Navy and are holding discussions with other potential users.

The three Marisat satellites have significantly exceeded their five year design lifetime and are still going strong. Collectively, the perfect launch record of a total of seven Comstar and Marisat satellites is enviable, and the fact that they are operating beyond their design lifetimes is due in no small part to the skilled and highly experienced Comsat General team that keeps them performing day in and day out. And, because **Comsat General** will not be providing follow-on replacements for these satellites, a significant chapter in the company's history will close as they wear down.

In searching for major new business opportunities to supplant the Marisat and Comstar programs, we were guided by the desire to participate in the service being offered, for merely providing the communications medium is limiting in terms of growth and revenue potential. Thus we were most pleased when late last year **Comsat General** was awarded a major contract by NBC to provide network television distribution to almost 200 NBC affiliate stations around the country. A year and a half in discussion, the result marks a departure from the past and a new business direction for **Comsat General**. We will provide 10 years of service to NBC, leasing the entire system rather than selling to the customer, thus in every sense assuming the role that has been that of AT&T. One significant advantage of the contract to NBC is that we can offer them a fixed annual lease rate for the 10 year period, which removes the uncertainties of rising distribution costs charged by the terrestrial microwave system television carriers. A second advantage is the higher reliability of using a satellite to distribute television signals. Terrestrial distribution has many points of potential failure, while satellite distribution offers a greatly reduced probability of failure.

The NBC system will be based upon using Ku-band transponders, operating in the 14 and 12 gigahertz ranges, for





Charles G. Kraft, Station Engineer, Santa Paula earth station, peels an abundant commodity at the Southern Californian earth station, an orange.

signal distribution. A distinct advantage of using these frequencies is that the antennas can be located on the premises of the affiliate station, without the signal interference restrictions found at lower frequencies.

A series of tests were conducted last year to assure NBC and ourselves that the system design was adequate to provide broadcast quality signals even under the most adverse conditions. During the testing period, the NBC affiliate station in Houston, Texas, was equipped with a transmit capability. While Hurricane Agnes provided gale-force winds, the station performed beyond expectations and served as one of the very few communication links to the outside world as terrestrial communications failed. Ultimately, it was a disruption in commercial power that terminated this practical demonstration, rather than degradation of the television signal.

In terms of capacity requirements, NBC's demands are considerable—they require four full-time transponders, one additional transponder available for use on weekdays, and five more transponders for weekend use. In addition to the fixed installations at the NBC company and affiliate stations, the service calls for **Comsat General** to own and operate six transportable terminals that can be moved rapidly around the country to provide on-site coverage of news and sports events. **Comsat General** will also supply the software to operate and control the total network. This combination of space and ground hardware gives NBC the ability simultaneously to provide 95 percent of the U.S. population with television programming. Under the terms of our contract with NBC, we can provide additional communication services over the system from which both parties can realize revenues. We are aggressively pursuing this potential business.

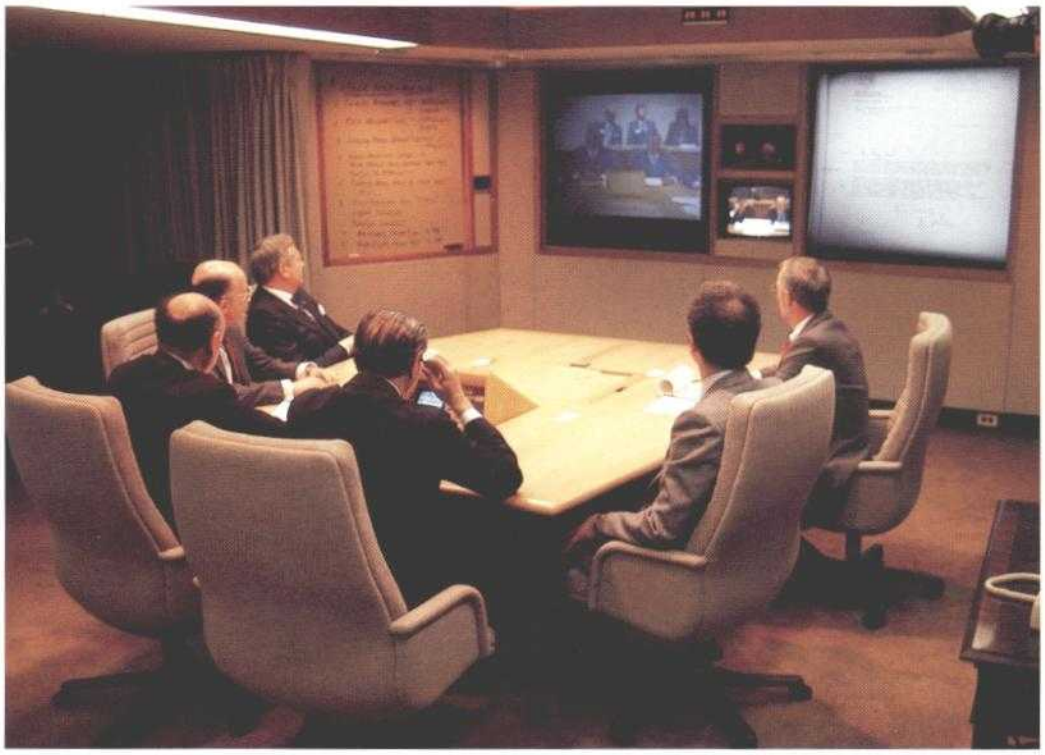
Looking toward the future, **Comsat General** plans to build and operate two of its own Ku-band satellites. An application was submitted to the Federal Communications Commission last fall for the Comstar-K system, which would be operational in 1988. Each of these high-powered spacecraft will be designed for a 10-year lifetime and provide a range of services. Comstar-K will offer a capability the Company has not previously enjoyed, enabling us to provide end-to-end services to our customers, which fits with our objective of being more than merely a provider of the communication link.

Comsat General will maintain and expand its leadership position in the communications industry. Through present and planned developments, the Company looks towards the future with enthusiasm and optimism. With the skills, the resources, and the desire to succeed, we have an unbeatable combination.

The Communications Services Mission:

Innovative and Profitable Services

by **Kenneth F. Manning,**
Vice President, Communications Services, Comsat General Corporation.
Photography by **William J. Megna,**
Chief Photographer, Comsat Magazine



Comsat General's Communications Services group was established to provide end-to-end services to the general public and private sector business, both domestically and internationally. To achieve that objective, we have as our mandate to seek out business opportunities that are in keeping with established needs of the market, to develop system concepts, to identify suitable partners and to establish viable business plans. In some cases, we seek to develop joint venture partnership arrangements with recognized and reputable companies where a weakness of one may be complemented by the strength of another.

In seeking out end-to-end service opportunities, the Communications Services group is motivated by the knowledge that in the telecommunications business the service providers who do not have some direct business connection with end users are restricted in their business potential.

The services that we either have already developed or are in the process of developing are teleseminars, that is, point-to-multipoint video communications with return audio; videoconferencing, that is, point-to-point two-way video and audio communications; and data services. The latter can be segmented into two parts: private-line data and electronic information transfer (i.e. electronic mail).

To provide international videoconferencing service, we have established Intelmet, which is a joint venture of **Comsat General** and InterContinental Hotels. Its two state-of-the-art videoconferencing centers at the InterContinental Hotels in New York and London are linked via satellites of the global Intelsat system. Since starting operation,

over 300 organizations have availed themselves of the opportunity to conduct Intelmet videoconferences.

We have learned a lot from our year of operating Intelmet, and we will be applying that knowledge to other Communications Services projects while making substantial improvements to the service itself. As a result of marrying the new video codec technology with digital communications, available on the Intelsat system, we are able to put into effect price decreases for the Intelmet service as great as 60 percent. Codec technology enables the conversion of full motion video images with sound to a digital bit stream from 56 to 1,544 kilobits per second (kbps), depending on the desired video quality. The approach is still not adequate for such applications as theatrical performances, but for the transmission of business meetings, it is fine. What it makes possible is full motion videoconferencing using far less communications capacity than has been possible up until now.

In the near future, we hope to open additional Intelmet videoconferencing centers at the InterContinental Hotels in Hong Kong and Riyadh, Saudi Arabia. In order for Intelmet to proceed to a full program, what is sought are repeat users between London and New York, which will show that a business need for the service exists.

In developing domestic services, we will be counting heavily on the use of more portable equipment (i.e. roll-in rooms) to keep both teleseminars and videoconferences as economical as possible. The logical system for us to turn to first as the carrier for our domestic services is the new Comsat General/NBC Distribution System, but we will also be seeking out other systems and approaches to bring about nationwide distribution of our services.

Experts in the field of broadcasting, the NBC owned and operated stations and the NBC affiliates would find the offering of video teleseminars services a natural adjunct to what they are already doing. There exists very little difference between originating a television program from a designated location and originating a teleseminar from that location. The local NBC affiliate has all the necessary capability to do this including an ENG (electronic news gathering) crew that can be dispatched to a location where an event is taking place. The reception points for the teleseminar service could be the NBC receive-only locations, but most likely will be at the user's own premises. Typically, 1.8-meter earth station antennas can be used to receive the teleseminar transmissions, making for a very inexpensive receive-only facility.

Under terms of our agreement with NBC, the Harris Corporation, as our subcontractor, is having six transportable earth stations built for exclusive NBC use, of which three are already completed. Meanwhile, three smaller transportable earth stations are being built for exclusive use of Comsat General Corporation. One use of these transportables—each equipped with a fold-up 4.5 meter diameter dish antenna—will be for teleseminar and videoconferencing applications to provide a transmit or uplink capability where it is needed. These transportables could be used to uplink teleseminars essentially from any remote location.

To offer electronic information transfer, we see ourselves joining forces with two types of established suppliers: long distance couriers and providers of communication copying machines, that is, facsimile transmission equipment. In conjunction with an established courier service, we will offer a document delivery service that will offer same-day service in all the nation's business centers. In many cases, it will not take much more than an hour for document pickup, transmission via satellite, receipt, and delivery by the courier services, regardless of the distances involved. The motivation to establish an alliance with an organization familiar with the

Intelmet Room, InterContinental Hotel, London, during inaugural ceremony for Intelmet service. Former New York City Mayor John Lindsay is third from left at table. To his left is Joseph P. Smyth, Senior Vice President, Marketing, InterContinental. Author is seated, back row, right.

***Facing Page,** Intelmet Room, InterContinental Hotel, New York City, at ceremony inaugurating international video conferencing service. Attendees in New York included Mayor Ed Koch, Robert Kinzie, President, Comsat General, Paul Sheeline, Chairman, InterContinental Hotels Corp, and Hans Sternik, President, InterContinental.*

marketing, operations and servicing of communications copiers is stimulated by our belief in the cost-effectiveness of eliminating the need for physical courier delivery wherever possible. **Comsat General**, by teaming itself with both courier and transmission copier organizations, will position itself to cover both sides of the marketplace.

By establishing local communications nodes in appropriate locations—nodes linked to earth stations, such as those in the Comsat General/NBC Distribution System—and, in turn, tying local business facilities and their individual work stations into each node, we will be able to offer electronic information transfer and other innovative services like private person-to-person video communications on an intra-company and, perhaps, even on a intercompany basis.

Although videoconferencing has yet to prove itself competitive, we feel that a future does exist for this service. One important fact that has been made abundantly clear to us as we have participated in the operation of Intelmet is that videoconferencing is not a one-for-one replacement for business travel, the claims of some in the business notwithstanding. Indeed, it is much more an adjunct to business travel rather than a replacement for it. The vast majority of businessmen still consider travel to distant cities a perquisite, and, generally speaking, the further the city is from home the higher the value placed on having the opportunity to travel there.

However, business people traveling to distant cities and their companies still can be sold on the value of videoconferencing when its benefits are presented this way: For those travel situations where previously the executive would be inclined to bring one or more people with him, he now has far less justification to go to such an expense. Let the support people stay home. At the distant city, the executive will meet with his client or customer in a videoconferencing room. Via the medium of two-way television, technical, legal, accounting and other experts back at the executive's home office can provide the necessary supporting information over the TV screen as the executive makes his case to the customer face-to-face.

Videoconferencing also has considerable appeal for organizations that, for strong business reasons, have placed parts of operating departments in separate locations. With a frequency of at least once a week and sometimes as frequently as once a day, members of these separate elements must get together to coordinate activities. Videoconferencing, in this case, is extremely useful whether the separate elements are scattered around the country or are only 10 miles apart. In fact, we find the appeal of videoconferencing actually improves the closer locations are to each other. The staffs of two facilities in the same region generally find little excitement in the prospect of traveling across town to visit each other. For them, communicating via videoconferencing is a much more cost-effective approach. And it adds a little excitement to what could otherwise be a humdrum activity.

Ultimately videoconferencing will be a one-on-one activity taking place from the individual offices of executives and support staff. The use of advanced video codecs, flexible local area networks coupled with an efficient long-haul communications facility, such as those in the Comsat General/NBC Distribution System, will soon make this video-

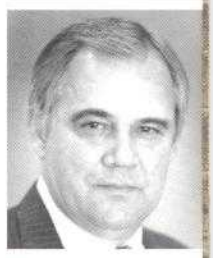
conferencing concept a reality.

In the months ahead, the Communications Services group of Comsat General Corporation will be working hard to set the stage for introduction of videoconferencing, teleseminars, and data services. We will also be promoting more aggressively the Intelmet international meeting service. We firmly believe that as a result of these efforts we will prove beyond question that the offering of innovative services in the telecommunications business can be a profitable endeavor.

At Intelmet inaugural ceremony, Mayor Ed Koch in New York City waves to John Lindsay in London. ***Right,*** *Comsat General engineer checks power line monitor in Intelmet control room, New York City. Next to monitor are three color lenses of video projector. Below that, outgoing signal monitor.*

Systems Technology Services: Technical Support on a Global Basis

by **W. Coleman Guthrie**, *Vice President, Systems Technology Services Division, Comsat General Corporation*
Photography by **William J. Megna**, *Chief Photographer, Comsat Magazine.*



High-quality telecommunications is of utmost importance to a nation's economic well-being. Development of effective internal and external communications systems is prerequisite to successful business operations. Increasingly, many nations are realizing the need for state-of-the-art telecommunications to enable them to participate fully in business, political, social and cultural areas.

Drawing upon Comsat General Corporation's unique combination of knowledge, experience and engineering strength, the Systems Technology Services Division (STS) provides on a global basis multi-discipline technical support to government agencies, telecommunications entities, private sector organizations and members of the Comsat family of companies.

The role of STS is twofold: First, it provides a wide range of technical and advisory services in defining communications needs and developing and implementing appropriate systems. Second, it serves as a broad-based, centralized engineering resource in overall systems engineering and in earth station and spacecraft engineering in support of the Corporation's expanding role in the telecommunications marketplace. Organized into two broad areas of responsibility, STS comprises over 80 engineers and support staff.

The Projects and Systems Development Division, headed by Frank Klisch, provides extensive experience in the areas of program management, system engineering, analysis and design, transmission engineering, and operational planning. The group is also active in the fields of electronic mail development, design of advanced high-technology communications systems, and business development associated with regional, domestic and business communications networks.

Under the direction of Robert D. Briskman, the System Implementation Division provides a wide variety of services. The Satellite Systems Engineering Division utilizes the expertise of its engineering staff to bring satellite systems into being and handles such responsibilities as construction specification and monitoring and operation, launch and transfer orbit activities, and operational support. The Earth Segment Engineering Division provides development, design, engineering, installation and operations support of earth terminals for diverse communications systems. The Engineering & Systems Integration Division includes the Spectrum Engineering Department which offers a capability in electromagnetic interference prediction and field measurement and analysis, and is experienced in both foreign and domestic earth station site selection. Also within the division is the Equipment Engineering Department, which provides capabilities in TTC&M (tracking, telemetry, command and monitoring) equipment and teleconferencing systems.

Thus, STS provides its clients with the entire range of technical assistance from design to implementation to operation and maintenance of communications systems, including:

- overall system planning—traffic analysis, cost and requirement analysis, system definition, development, and system design;
- project management—preparation of technical specifications for both space and ground segments, preparation of requests for proposals, proposal evaluation, contract negotiations, insurance assistance;
- monitoring of spacecraft design,

integration, testing and launch operations through on-site production monitoring, quality assurance, testing, design reviews and progress evaluation;

- transmission planning, frequency coordination, and development of transmission technology;
- operation and maintenance support of communications satellites and TTC&M stations associated with the launch and in-orbit monitoring of satellites;
- design, development, and maintenance of communications earth stations, site selection and testing, as well as design, development, and maintenance of data base and computer software;
- launch vehicle coordination and spacecraft launch services, launch vehicle selection, launch site testing, and in-orbit testing; and
- training services in technical specialty areas and system operation.

Telecommunications administrations in more than 40 different countries have chosen **Comsat General** to assist in the development of new satellite communications systems. For example, the broad range of STS capabilities is particularly well illustrated in its support to the Arabsat program. Arabsat, a consortium of 21 nations of the Arab League, selected STS to provide a comprehensive range of consulting services in developing a regional satellite communications system to enhance cooperation among its member nations through exchange of information and programs. The Arabsat consulting services contract embraces all major elements of the system, including traffic analysis, system planning and design, preparation of spacecraft and ground control specifications, evaluations of bids from manufacturers, contract monitoring, supervisory assistance in launch arrangements, training of Arabsat technical and administrative personnel, and operational aspects.

In addition to a program office in Riyadh, Saudi Arabia, STS also supports the Arabsat program with a full-time staff supervising spacecraft construction on-site at Ford Aerospace and Communications Corp. in Palo Alto, California, at Aerospatiale in Cannes, France, and at MBB in Lampoldshausen, West Germany. Engineering support is also provided from the STS Satellite Systems Engineering Division in Los Angeles. In addition, staff members closely monitor the development of ground stations provided by Nippon Electric Company, Tokyo, Japan. The principal satellite of this two-satellite system is expected to be launched later this year aboard the Ariane launch vehicle with the back-up satellite to follow in 1985.

The Republic of Indonesia recognized a need for more advanced communications, particularly vital for this nation of numerous, far-flung islands seeking rapid development in the fields of agribusiness, industry, and education. In 1976, Indonesia's first satellite system, Palapa-A, was launched, and the country has benefited from vastly improved internal communications and improved communications links to the rest of the world. STS has played an important role in continuing improvements of the system, including monitoring the construction, testing, and launch of a second-generation Palapa-B satellite (with double the transponder capacity); providing assistance in overall system management, operation and maintenance of earth terminals; and supervision of the expansion of the ground network system.

STS has also been instrumental in the development of the first domestic satellite system for Mexico, known as Morelos, with launch planned on the Space Shuttle in late 1985. The Republic of Cameroon enlisted the services of STS in planning and implementing its domestic satellite system using Intelsat transponder capacity. For some time, STS has worked closely with Italy on the design and development of its Italsat satellites, providing support in the areas of program definition and implementation engineering.

Currently, STS is pursuing opportunities to provide comprehensive technical advisory services for regional and domestic satellite systems to serve countries in South America and will be providing technical assistance to several nations in the Far East.

The activities of STS involve substantial work in advanced communications development. Prime areas of activities include electronic mail, satellite teleconferencing, and satellite design.

Satellite Business Systems (**SBS**) has been one of STS's customers for satellite teleconferencing services. **SBS**, a partnership among **Comsat**, IBM, and Aetna, provides networking services which can be used for voice, data, facsimile, and full-motion video teleconferencing communications. STS assisted **SBS** in the redesign and relocation of its two teleconferencing rooms at its headquarters facility in McLean, Virginia.

Facing Page, *Just some of the staff of Comsat General's Systems Technology Services (STS) Division, photographed at L'Enfant Plaza, Washington, D.C. At front of left row is Robert D. Briskman, Vice President, Systems Implementation. At front of right row is Frank K. Klisch, Assistant Vice President, Project and Systems Development.*

STS personnel also designed and installed a teleconferencing exhibit for the Comsat pavilion at the 1982 World's Fair International Energy Exposition in Knoxville, Tennessee. In support of **Comsat General**'s partnership with InterContinental Hotels Corporation for provision of video teleconferencing services (Intelmet), STS was responsible for the design, equipment installation, and maintenance of Intelmet teleconferencing facilities at InterContinental Hotels located in London and New York.

In addition to supporting foreign entities, STS is also responsive to the expanding communications needs of both government and industry. It has worked closely with NASA, providing technical assistance in the design of advanced satellite communications for the 1990s and beyond and aiding in the design of the NASA Space Station; with the U.S. Department of State, providing remote sensing capabilities; and, most recently, with the Defense Advanced Research Project Agency (DARPA), applying advanced videoconferencing technology to the design of a low-bit-rate videoconferencing network which will employ telephone channels to transmit videoconferencing images.

STS is also committed to the improvement of corporate worldwide communications networks. For example, STS is presently working with petroleum companies to design satellite communications systems for real-time data transmission between off-shore and desert oil exploration sites and headquarters sites. Such instantaneous transmission of seismic profiles and similar data from drill sites to geophysicists in headquarters locations for analysis and recommendations can dramatically reduce the enormous expense and loss of valuable lead time associated with today's three- to four-day normal turnaround.

STS's strong, broad-based engineering talent provides other elements of the Corporation with a reliable, knowledgeable source of support in its on-going programs. Satellite Television Corporation (**STC**), a Comsat subsidiary, is developing a satellite-to-home subscription television service in which subscribers will receive multiple channels of high-quality programming via satellite. Engineers from STS assist **STC** in the areas of digital transmission engineering, system transmission parameters, modulation techniques, home terminal development, program scrambling systems, uplink earth stations, and satellite construction monitoring, and are currently designing and implementing satellite ground equipment which will be used in controlling the STC satellite system.

In addition to the videoconferencing assistance mentioned earlier, STS is also supporting **SBS** with space segment design assistance, spacecraft construction monitoring, design and implementation of the SBS satellite command and control network and assistance with in-orbit testing.

Similiarly, STS engineers were responsible for many aspects of the system engineering and planning associated with the Comsat General/NBC satellite distribution system. When completed, this system will be utilized by NBC to distribute its television programming material to over 180 NBC-owned and affiliated television stations throughout the United States. This major new program promises to be the cornerstone of **Comsat General**'s entry into the rapidly expanding domestic telecommunications marketplace.

Finally, STS engineers provided a broad range of system engineering support in development of **Comsat General**'s recent FCC filing for authorization to construct, own, and operate an advanced K-band communications satellite. When operational, the satellite will be utilized to provide a variety of advanced telecommunications services within the continental U.S.

In summary, the Systems Technology Services division of **Comsat General** has become a world leader in telecommunications engineering, leadership built on **Comsat**'s pioneering development of commercial satellite communications and honed and refined through technical assistance to organizations in more than 40 different countries.

COMSAT

WORLD SYSTEMS DIVISION

COMSAT, through its World Systems Division, provides international satellite communications services, linking the people of the United States with all parts of the world.

Through the earth station-to-satellite connections provided by **COMSAT**, people across the country can communicate internationally:

- ☐ Via telephone or telex;
- ☐ Through electronic data transfer;
- ☐ By transmitting copies of documents electronically;
- ☐ By broadcasting television programming or holding business meetings through teleconferencing.

In 1984, **COMSAT** will introduce a new all-digital communications service tailored especially for business. Digital Express, offered initially in the Atlantic Ocean region, features a range of transmission rates, accommodating voice, data, facsimile and teleconferencing communications. Digital Express permits businesses to gain access to the international satellites through major U.S. international earth stations, medium-sized earth stations located near urban areas or small antennas on company premises. Businesses may use the service full-time, part-time or on an occasional basis.

COMSAT furnishes telecommunications services through satellites of the 108-nation **INTELSAT** organization and through 10 international earth stations located in the United States and in the Pacific Trust Territories.

No other communications system in the world allows its users to communicate with more international locations in as many different ways. More than 170 countries and territories use **INTELSAT** system services full time.

For more information on international communications services available through **COMSAT** World Systems Division, contact:

COMSAT
World Systems Division
Business Development
950 L'Enfant Plaza, S.W.
Washington, D.C. 20024
Telephone: (202) 863-6235
Telex: 89-2668

The INTELSAT Global System

COMSAT

Providing Circuits for VOICE, DATA, FACSIMILE and VIDEO Services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Sweden
United Kingdom
Ireland
Netherlands
Poland
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Belgium
Switzerland
France
Germany
Austria
Romania
Yugoslavia
Spain
Italy
Portugal
Turkey
Greece
Malta
Tunisia
Gibraltar
Cyprus
Syria
Iran Islamic Rep.
Israel
Iraq
Kuwait
Jordan
Bahrain
Qatar
Pakistan
United Arab Emirates
Oman
Yemen, P.D.R.
Yemen, A.R.
Djibouti
Saudi Arabia
Egypt
Libya
Algeria
Morocco
Canary Islands
St. Pierre
Bermuda
Turks and Caicos Is.
Cayman Islands
Cuba
Haiti
Dominican Rep.
Antigua
Guadaloupe
Martinique
Barbados
Trinidad & Tobago
Guyana
Surinam
French Guiana
Belize
Jamaica
Honduras
Nicaragua
Netherlands Antilles
Salvador
Costa Rica
Panama
Venezuela
Colombia
Ecuador
Peru
Brazil
Bolivia
Paraguay
Argentina
Uruguay
Chile
Falkland Islands
Mauritania
Mali
Senegal
Cape Verde
Gambia
Guinea
Sierra Leone
Liberia
Ivory Coast
Ghana
Upper Volta
Niger
Nigeria
Cameroon
Togo
Benin
Central African Rep.
Sudan
Ethiopia
Somalia
Uganda
Kenya
Rwanda
Burundi
Gabon
Congo
Zaire
Sao Tome e Principe
Ascension Island
Tanzania
Angola
Zambia
Malawi
Zimbabwe
Botswana
Mozambique
Madagascar
Mauritius
Seychelles
Swaziland
South Africa
Lesotho
Atlantic Ocean
Indian Oce
Earth Stations
Operational
Planned 1984
Pacific Ocean Region
Atlantic Ocean Region
Indian Ocean Region
Communications Satellite Corporati
World Systems Business Developm
Washington, D.C.
February 1984

INTELSAT
Earth Stations in International Service

Earth Stations listed were operating as of January 31, 1984. Figures in parenthesis following the listing of an earth station indicate the number of antennas at that site which provide service through the regional satellites.

ATLANTIC OCEAN REGION

Algeria: Lakhdaria
Angola: Cacuaco
Argentina: Balcarce (2), Bosque Alegre
Ascension Island: See United Kingdom
Austria: Aflenz
Bahrain: Ras Abu Jarjur
Barbados: Barbados
Belgium: Lessive (2)
Belize: Belmopan
Bermuda: See United Kingdom
Bolivia: Tiwanacu
Brazil: Tangua (2)
Cameroon: Zamengoe
Canada: Des Laurentides, Mill Village (2)
Canary Islands: See Spain
Cape Verde: Varzea
Cayman Islands: Grand Cayman
Central African Republic: Mpoko
Chile: Longovilo (2)
Colombia: Choconta (2)
Congo: Mougouni
Costa Rica: Tarbaca
Cuba: Caribe
Cyprus: Makarios
Diego Garcia: See United Kingdom
Dominican Rep.: Cambita
Ecuador: Quito
Egypt: Maadi
El Salvador: Izalco
Ethiopia: Sululta
Falkland Islands: Falkland Islands
France: Bercenay-En-Othe (2), Pleumeur-Bodou
  French Guiana: Trou-Biran
  Martinique: Trois Ilets
  St. Pierre: Pain de Sucre
French Guiana: See France
Gabon: N'koltang (2)
Gambia: Banjul
Germany, Fed. Rep. of: Raisting (3), Usingen
Ghana: Nkutunse
Gibraltar: See United Kingdom
Greece: Thermopylae (2)
Guadaloupe: Destrellan
Guatemala: Quetzal
Guinea: Wonkifong
Guyana: Georgetown
Haiti: J-C Duvalier
Honduras: Lempira
Iceland: Skyggnir
Iran, Islamic Rep.: Shahid Dr. Ghandy
Iraq: Dujail
Israel: Emeq Ha'ela (2)
Italy: Fucino (2), Lario
Ivory Coast: Abidjan (2)
Jamaica: Prospect Pen
Jordan: Baqa
Kenya: Longonot
Kuwait: Umm Al-Aish (2)
Liberia: Sinkor
Libya: Tripoli
Malawi: Kanjedza
Mali: Sullymanbougou (2)
Martinique: See France
Mexico: Tulancingo (2)
Morocco: Sehouls
Mozambique: Boane
Netherlands: Burum
  Netherlands Antilles: Vredenberg
Netherlands Antilles: See Netherlands
Nicaragua: Managua
Niger: Karma
Nigeria: Lanlate, Kujama
Panama: Utibe (2)
Paraguay: Aregua
Peru: Lurin
Poland: Psary
Portugal: Sintra
Romania: Cheia
Sao Tome E Principe: Sao Marcal
Saudi Arabia: Riyadh, Taif
Senegal: Gandoul
Sierra Leone: Wilberforce
South Africa: Pretoria (2)
Spain: Buitrago (3)
  Canary Islands: Aguimes
St. Pierre: See France
Sudan: Umm Haraz
Surinam: Santo Boma
Swaziland: Ezulwini
Sweden: Tanum (2)
Switzerland: Leuk (2)
Togo: Cacavelli
Trinidad & Tobago: Matura Point
Turkey: Ankara
Turks and Caicos: Grand Turk
Uganda: Mpoma
U.S.S.R.: Dubna
United Arab Emirates: Abu Dhabi
United Kingdom: Goonhilly (3), Madley
  Ascension Island: Ascension (2)
  Bermuda: Devonshire
  Diego Garcia: Diego Garcia
  Gibraltar: Gibraltar
U.S.A.: Andover (2), Etam (3)
Upper Volta: Somgande
Uruguay: Manga
Venezuela: Camatagua (2)
Yemen, A.R.: Sanaa
Yugoslavia: Jugoslavija
Zaire: N'sele

INDIAN OCEAN REGION

Algeria: Lakhdaria
Australia: Ceduna (2)
Bahrain: Ras Abu Jarjur
Bangladesh: Betbunia, Talibabad
Botswana: Kgale
Brunei: Telisai
Burma: Rangoon
Burundi: Bujumbura
China: Peking
China: Taipei
Cyprus: Makarios
Djibouti: Ambouli
France: Pleumeur-Bodou, Bercenay-En-Othe
Germany, Fed. Rep. of: Raisting (2)
Greece: Thermopylae
Hong Kong: See United Kingdom
India: Ahmed, Vikram
Indonesia: Djatiluhur
Iran, Islamic Rep.: Shahid Dr. Ghandy
Iraq: Dujail
Italy: Fucino
Japan: Yamaguchi (2)
Jordan: Baqa
Kenya: Longonot
Korea, Rep. of: Kum San
Kuwait: Umm Al-Aish
Libya: Tripoli
Madagascar: Philibert Tsiranana
Malawi: Kanjedza
Malaysia: Melaka
Maldives: Maldives
Mauritius: Cassis
Nepal: Sagarmatha
Netherlands: Burum
Niger: Goudel
Nigeria: Lanlate
Oman: Al Hajar
Pakistan: Deh Mandro
Philippines: Pinugay
Portugal: Sintra
Qatar: Doha
Romania: Cheia
Rwanda: Kicukiro
Saudi Arabia: Riyadh
Seychelles: Bon Espoir
Singapore: Sentosa
Somalia: Kaaraan
South Africa: Pretoria
Spain: Buitrago
Sri Lanka: Padukka
Syria: Sednaya
Tanzania: Mwenge
Thailand: Si Racha
United Arab Emirates: Dubai, Ras Al Khaimah
U.S.S.R.: L'vov
United Kingdom: Madley (2)
  Hong Kong: Hong Kong (2)
Yemen A. R.: Sanaa
Yemen, P.D.R.: Ras Boradli
Yugoslavia: Jugoslavija
Zambia: Mwembeshi

PACIFIC OCEAN REGION

American Samoa: See U.S.A.
Australia: Moree (2), Carnarvon
Brunei: Telisai
Canada: Lake Cowichan
China: Peking, Shanghai
China: Taipei
Cook Islands: Avarua
Fiji: Suva
France:
  New Caledonia: L'ile Nou
  Fr. Polynesia: Papenoo
Fr. Polynesia: See France
Guam: See U.S.A.
Hong Kong: See United Kingdom
Indonesia: Djatiluhur
Japan: Ibaraki
Kiribati: Christmas Island
Korea, Rep. of: Kum San
Malaysia: Kuantan
Marshall Islands: See U.S.A.
Micronesia: See U.S.A.
Nauru: Nauru
New Caledonia: See France

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Kuwait: Umm Al-Aish
Libya: Tripoli
Madagascar: Philibert Tsiranana
Malawi: Kanjedza
Malaysia: Melaka
Maldives: Maldives
Mauritius: Cassis
Nepal: Sagarmatha
Netherlands: Burum
Niger: Goudel
Nigeria: Lanlate
Oman: Al Hajar
Pakistan: Deh Mandro
Philippines: Pinugay
Portugal: Sintra
Qatar: Doha
Romania: Cheia
Rwanda: Kicukiro
Saudi Arabia: Riyadh
Seychelles: Bon Espoir
Singapore: Sentosa
Somalia: Kaaraan
South Africa: Pretoria
Spain: Buitrago
Sri Lanka: Padukka
Syria: Sednaya
Tanzania: Mwenge
Thailand: Si Racha
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U.S.S.R.: L'vov
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Hong Kong: Hong Kong (2)
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Zambia: Mwembeshi

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China: Taipei
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New Caledonia: L'ile Nou
Fr. Polynesia: Papenoo
Fr. Polynesia: See France
Guam: See U.S.A.
Hong Kong: See United Kingdom
Indonesia: Djatiluhur
Japan: Ibaraki
Kiribati: Christmas Island
Korea, Rep. of: Kum San
Malaysia: Kuantan
Marshall Islands: See U.S.A.
Micronesia: See U.S.A.
Nauru: Nauru
New Caledonia: See France
New Zealand: Warkworth
Palau: See U.S.A.
Philippines: Pinugay
Saipan: See U.S.A.
Singapore: Sentosa
Solomon Is.: Honiara
Thailand: Si Racha
Tonga: Nuku 'Alofa
United Kingdom:
Hong Kong: Hong Kong
U.S.A.: Brewster, Jamesburg, Santa Paula
American Samoa: Pago Pago
Guam: Pulantat, Finegayan
Hawaii: Paumalu, Hickam
Marshall Islands: Majuro, Ebeye
Micronesia: Ponape, Truk, Kosrae, Yap
Palau: Koror
Saipan: Susupe
Vanuatu: Port Vila
Western Samoa: Afiamalu

PLANNED INTERNATIONAL ANTENNAS (1984)

ATLANTIC OCEAN REGION

Benin
Bermuda: Devonshire
Botswana: Kgale
Canada: Mill Village
France: Pleumeur-Bodou, Rambouillet
Ireland: Elfordstown
Italy: Fucino
Lesotho: Ha Sofonia
Malta
Mauritania: Nouakchott
Oman
Peru: Miguel Colina Marie
Qatar: Doha
Spain: Robledo
Switzerland: Leuk
Tunisia: Tunis
U.S.A.: Roaring Creek
United Kingdom: Antigua, Goonhilly, London Ealing, Thameside
Uruguay

INDIAN OCEAN REGION

Egypt: Maadi
Iran Islamic Rep.: Chah Bahar
Italy: Lario
Japan: Yamaguchi
Korea, D.P.R.: Pyongyang
Macao: See Portugal
Malaysia: Kota Kinabalu
Pakistan: Deh Mandro
Portugal: Macao
Sri Lanka: Trincomalee
Thailand: Si Racha
Uganda: Kampala

PACIFIC OCEAN REGION

Australia: Epping, Healesville
Canada: Lake Cowichan
Kiribati: Bairiki
New Zealand: Warkworth
Papua New Guinea: Port Moresby
Philippines: Pinugay

N O T E S

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been filled with the election of three men previously employed by **Comsat** or its subsidiaries. James A. Cole, a co-founder of Amplica, Inc., and most recently its Executive Vice President, becomes Vice President, Marketing and Development. Dr. William P. Osborne, most recently Associate Professor of Electrical Engineering at the University of Nebraska, becomes Vice President, Advanced Technology, and Alan Korobov, formerly **Comsat**'s Director of Budgets, becomes Vice President, Finance. Although his most recent position was with the University of Nebraska, Dr. Osborne comes to Comsat Technology Products with considerable Comsat experience behind him. From 1980 to 1981, he was Vice President, Engineering, of Comsat TeleSystems, and from 1979 to 1980, he was Division Director of the Component Products Division and, subsequently, the Equipment Integration Division of **Comsat Laboratories**.

At Comsat TeleSystems, Inc., Fairfax, Virginia, Rick L. Mantz has been named Vice President of Engineering. He was formerly Director of ITT's Defense Communications Division, located in San Diego, California.

Stephen D. Hofflich has been named Vice President, Information Systems, for Satellite Television Corporation (**STC**). Mr. Hofflich will be responsible for developing a reliable and integrated information systems operation for **STC**. Previously, he was Vice President, Information Systems, for Warner Amex Satellite Entertainment Company.

Also at **STC**, Dr. Hazel Kahan has been named Vice President of Research and Market Planning. She was previously Vice President of Research at Warner Amex Cable Communications. Dr. Kahan is responsible for all marketing and programming research as well as strategic market planning activities and projects.

Highlights of the seventeenth session of Inmarsat Council

The seventeenth session of the Council of the International Maritime Satellite Organization (**Inmarsat**) took place in London from February 8 through 15. These are some of the highlights of the meeting:

- Saudi Arabia became a member of the Inmarsat Council with an investment share of 1.6 percent;
- In order to insure availability of space segment in the event of failure of a Marisat operational satellite, the Council authorized the Director General to incorporate into the Marisat space segment lease contract four three-month options, which would entitle **Inmarsat** to use the Marisat satellites in the Atlantic Ocean Region and/or the Indian Ocean Region, if required;
- The Council approved the provision on a month-to-month basis of a preemptible part-time voice-grade circuit leased service between a designated ship earth station (SES) and a designated land point via a designated coastal earth station (CES) at a prearranged period of time.

The next session of the Council will be held from the 11th to the 18th of July in Moscow.

Stephen B. Schwartz named President and CEO of SBS

Stephen B. Schwartz has been named President and Chief Executive Officer of Satellite Business Systems (**SBS**), the SBS Partners have announced.

Mr. Schwartz, who is an IBM Vice President, succeeds Robert C. Hall, who has led **SBS** into full operation over the past four and a half years. Mr. Hall originally was named Chairman of the company, a new position, but now has resigned to seek other business opportunities.

SBS is the nationwide communications company owned jointly by Aetna Life & Casualty, **Comsat**, and IBM. Its service facilities include three satellites in orbit and more than 100 communications earth stations.

The SBS Partners expressed confidence in **SBS**'s future growth and success. The Partners noted that **SBS** is providing reliable voice and data transmission services to growing numbers of customers, including large firms, small businesses, and residential users. The management moves, they said, are being made to strengthen further the SBS management team during a period of rapid change and unsettled conditions in the communications marketplace.

Stephen B. Schwartz has been named President and Chief Executive Officer of Satellite Business Systems (SBS).

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Most recently, Mr. Schwartz was Vice President, Asia Staff Operations for the IBM World Trade Americas/Far East Corporation.

H. William Wood was senior Comsat, then Intelsat official

H. William Wood, a senior official of the International Telecommunications Satellite Organization (**Intelsat**), died on March 17. Prior to joining **Intelsat**, Mr. Wood held executive positions with **Comsat**. At the time of his death, he was **Intelsat**'s Deputy Director General, Operations & Development.

Dr. Joseph V. Charyk, Chairman and Chief Executive Officer of **Comsat**, issued this statement concerning Mr. Wood: "Mr. Wood's death is a special loss to **Comsat** since, after his retirement from the U.S. Navy, he joined our organization in 1965 and was one of the founding contributors to the development of our capabilities and to the pursuit of our goal to establish a global communications satellite system. His contributions during this developmental phase of **Comsat**'s organization were critical and diverse and his family and associates can take pride in the unique contributions that he made to the development of communications satellite systems. Mr. Wood left **Comsat** in 1977 to join **Intelsat** and, again, his experience, wisdom and judgment were invaluable in establishing the effectiveness of the Intelsat operational network. We will miss him, but always remember his contributions and his friendship."

"Hawaiian Hub Service" will benefit entire Pacific Basin

Comsat has proposed a way for the developing countries of the Pacific Basin to improve their domestic and international communications through a single, low-cost service. Speaking at the Pacific Telecommunications Conference (PTC), January 8 through 11 in Honolulu, Hawaii, David E. Gourley, Vice President for Business Development of the World Systems Division, explained how **Comsat**'s Paumalu earth station, located on the north shore of the Island of Oahu, Hawaii, could serve as a hub for communications from earth stations located in remote areas throughout the Pacific.

The "Hawaiian Hub Service" concept builds upon **Intelsat**'s new Vista Service, which permits countries to lease satellite capacity on a circuit-by-circuit basis to extend communications to rural and remote areas. The circuits can be acquired on either a non-preemptible (guaranteed restoration) or preemptible (without spare) basis, with preemptible service charged at half the rate of non-preemptible. Approved by the Intelsat Board of Governors at its December 1983 meeting, Vista Service can be used for either domestic or international communications, thus enabling communications among a number of Pacific Islands, not all of which, for example, need to belong to the same country. A new earth station standard, Standard D, was also approved by **Intelsat** for use with this service, incorporating both small, five-meter antennas for limited traffic in remote locations, and larger, eleven-meter antennas intended to act as hubs for groups of the small stations.

With "Hawaiian Hub Service," countries avoid the expense of constructing the large hub stations, estimated to cost at least $1 million each, by using one of the antennas at Paumalu as a hub station. Under this arrangement, each small earth station would establish a circuit with Paumalu through the Vista capacity on the Intelsat spare satellite. Through a retail carrier switch in Hawaii, the circuit would be interconnected either through Paumalu back into the Vista network in the Pacific for service between remote antennas, into the international Pacific network for service to large international antennas, or into the U.S. domestic network.

This service will make it possible to extend modern satellite communications to remote areas throughout the Pacific in a most cost effective manner. The opportunity for reliable communications is expected to be a great boon to the economic development of the island nations of the Pacific.

N O T E S

Software for Tandem offered by World Systems Division

Comsat World Systems Division is licensing software developed for use on Tandem computers. Developed under **Comsat**'s unique program—the Network Management Action System for Tandem 16 Nonstop and Nonstop II Computers—the software comes in six separately priced packages. **Comsat** will customize the software to meet the customer's specific requirements on a time and material basis. All packages are menu-driven, have on-line file maintenance, on-line reporting, are modular and employ a security protection package.

There are several major functions that can now be performed on Tandem computers with the addition of **Comsat**'s new software. The Television Scheduling (TVS) subsystem automates the tasks involved in processing a customer request for television service and can generate accounts receivable data.

The Circuit Transactions Subsystem (CTS) automates the processing of service by allocating communications resources such as basebands, circuits and channels.

The Equipment Records System (ERS) maps the route of communications traffic through the various components of a facility. In addition, ERS can help plan the traffic load on equipment.

A Communications Network (CNET) package provides word processing and electronic mail capabilities.

A Monitoring and Control System (MACS) has also been programmed to provide real-time monitoring of status and alarm points throughout a facility, sensing equipment malfunctioning, and identifying traffic that is affected.

A Network Status Module (NSM) provides an efficient means of gathering technical details on facility operations which may be useful in fulfilling government reporting requirements and in evaluating facility operations. Also included are displays for help, query and historical file search.

For additional information, call Donald W. Kellerman at (202) 863-6687.

ERT wins contract to review feasibility of acid rain concept

Environmental Research & Technology, Inc. (ERT), has been awarded a major study by the Electric Power Research Institute (EPRI) to examine the technical and operational feasibility of the Massive Aerometric Tracer Experiment (MATEX) field program concept. EPRI is the research and development arm of the United States electric utility industry.

The overall objectives of MATEX are: 1) to establish, for present sources in the eastern U.S. and southeastern Canada, reliable estimates of the acidic deposition ("acid rain") which results from man-made sources, and 2) to provide an empirical basis for estimating the reduction of source emissions in that or any other area.

ERT will examine the feasibility of the MATEX concept through constructing and comprehensively evaluating several alternative experimental designs.

Ameritech, SBS RealCom to target real estate projects

Ameritech and Satellite Business Systems (**SBS**) have announced a five-year agreement between Ameritech Communications, Inc., and SBS Real Estate Communications Corporation (RealCom) for the provision of tenant telecommunications services in 60 major office and mixed-use real estate developments in major cities across the United States.

"The combined size, expertise, and financial strength of the participants make their tenant-services effort the largest and most cost-efficient joint-tenant service program ever undertaken," according to a joint statement issued by both companies. "Developers throughout the nation will have the opportunity to benefit from the program on the basis of terms and conditions designed to reflect the needs of each particular project," the statement continued.

Ameritech Communications will supply RealCom with $100 million in telecommunications equipment and will install, maintain, and administer the equipment at an additional cost of $80 million. Using

Continued on next page

Ameritech Communications equipment and support services, RealCom will provide tenant services within the developments.

Ameritech President and Chief Operating Officer James J. Howard said that Ameritech will immediately join RealCom in providing tenant services in the National Press Building and in the National Place Building, both in Washington, D.C., as well as in the 333 West Wacker Drive Building in Chicago. In all of these buildings, he said, the installation of advanced Ameritech equipment is now being planned and will soon be implemented.

RealCom-Ameritech will also bring advanced tenant services to Urban Investment and Development Company's planned 900 North Michigan Avenue development in Chicago, as well as to other planned projects of Urban, with which RealCom has a national agreement.

RealCom is a subsidiary of Satellite Business Systems (**SBS**), the communications company owned by Aetna Life & Casualty, **Comsat**, and IBM. RealCom contracts with building owners and tenants as a single-source provider of comprehensive, end-to-end voice, data, and video services on an economical basis, utilizing state-of-the-art equipment provided by Ameritech Communications.

Stephen B. Schwartz, President of **SBS**, said RealCom will "aggressively market the new services across the United States. This teaming arrangement will ensure RealCom lower underlying costs, a wider product line, and more depth of experience than any other supplier in the tenant-services industry. We are delighted to be teamed with Ameritech whose skills and resources will be invaluable to RealCom and its customers."

Agreement could open way to civil aviation satellite data link

Comsat World Systems Division and the Mitre Corporation have signed a Memorandum of Understanding regarding experiments with a satellite data link for civil aviation. Under this agreement, **Comsat** plans to provide access to one of the Inmarsat satellites and Mitre plans to develop and procure avionics equipment for installation on one or more aircraft such as those used for commercial/passenger service. The experiments are contingent upon approval by **Inmarsat** and the Federal Communications Commission.

Current plans call for the tests to be conducted during 1985. Test transmissions will consist of messages such as those used for oceanic air traffic control. The communications path will be from an aircraft to an Inmarsat satellite and then to a Comsat Coast Earth Station, operated by Maritime Services of the World Systems Division. From there the signal will be relayed by leased landline to Mitre facilities in McLean, Virginia. Data rates of this service will range from 200 to 400 bits per second.

USIA's videoconferencing trial uses small earth station

From March 19 to 23, Comsat World Systems Division provided the United States Information Agency (USIA) with an international video teleconferencing demonstration. As a result of the demonstration, USIA had for the first time the two-way, compressed video capacity to transmit public affairs and cultural programming between a studio in its Washington, D.C., headquarters and an overseas location—in this case a British Telecom studio in London.

Joel R. Alper, President of Comsat World Systems Division, commented, "We are pleased to cooperate with USIA in this very exciting display of **Comsat**'s capability to transmit compressed video signals through a small earth station. The five-day event demonstrates one of the many applications which utilize **Comsat**'s new Digital Express service."

Each telecast was transmitted by **Comsat** from a 2.4 meter transportable earth station located adjacent to USIA's Washington, D.C., studios to an Atlantic Ocean Intelsat communications satellite. It was relayed to a British Telecom International earth station in the U.K., and finally carried terrestrially to British Telecom's London videoconferencing studio. The transmission between Comsat and BTI earth stations consisted of a 1.544 megabits per second compressed video signal and an associated audio signal. The same facilities were employed for the U.K. to U.S. transmission.

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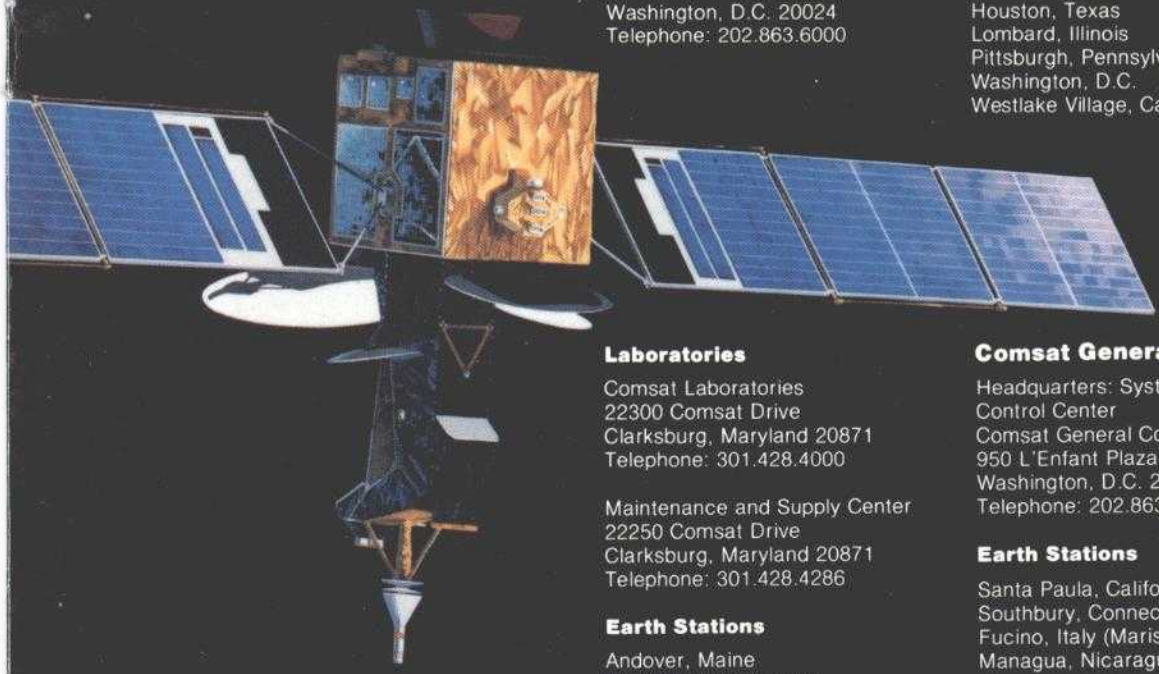

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Kosrae, Fed. States of Micronesia
Majuro, Rep. of Marshall Islands
Pago Pago, American Samoa
Palau, Rep. of Palau
Paumalu, Hawaii
Ponape, Fed. States of Micronesia
Pulantat, Guam
Susupe, Northern Mariana Islands
Truk, Fed. States of Micronesia
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