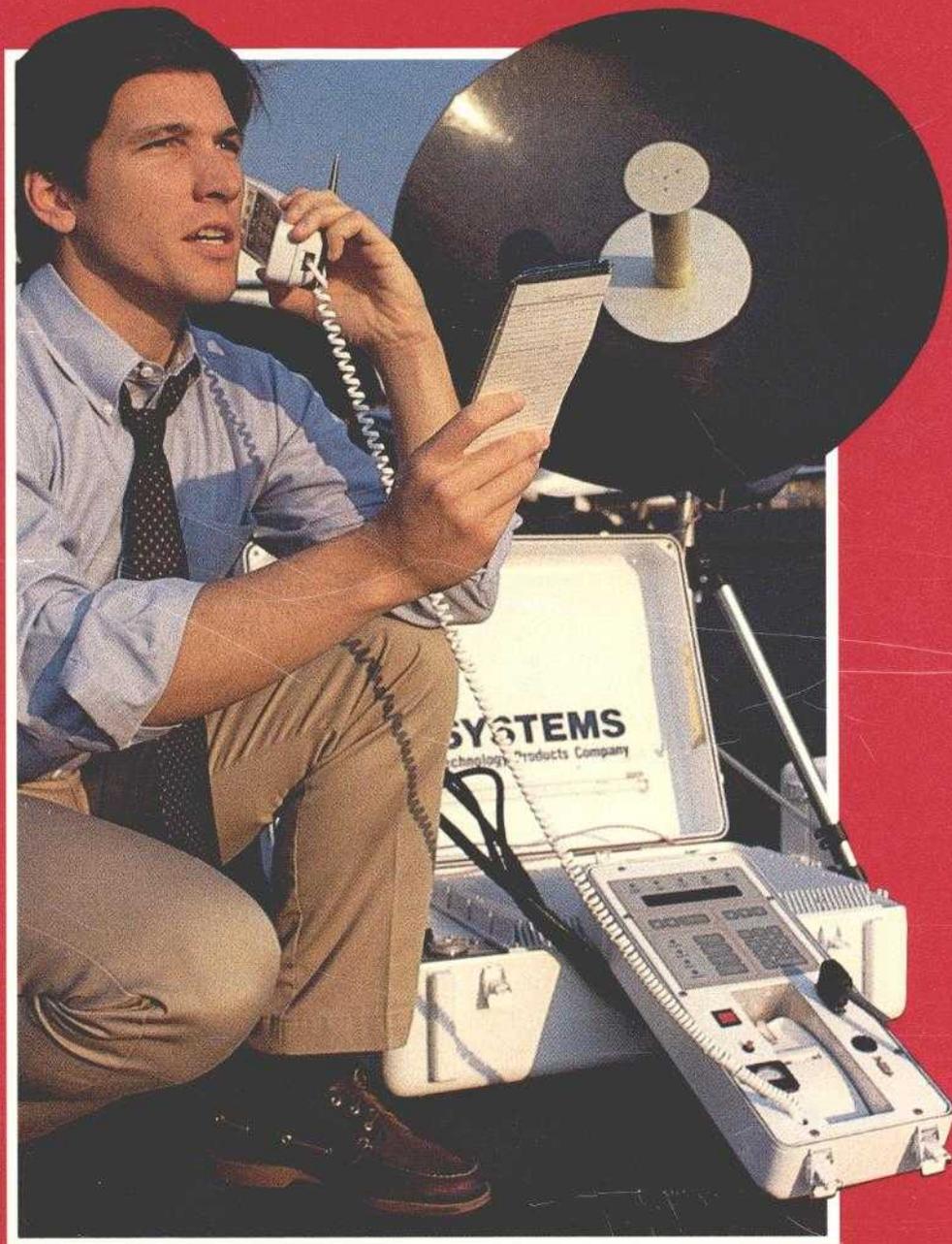


COMSAT

COMMUNICATIONS SATELLITE CORPORATION MAGAZINE

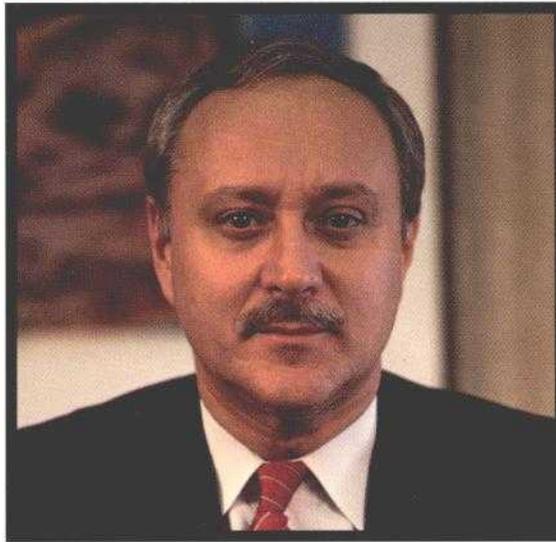
1985



Number 17

VIEWPOINT

by Irving Goldstein,
Chairman and Chief Executive Officer,
Communications Satellite Corporation



In October, Dr. Charyk retired as Comsat's Chairman and Chief Executive Officer, a position I then assumed. I consider him a tough act to follow in every respect. For most of the past twenty years, I have had the good fortune of working closely with Dr. Charyk and have benefitted from his sharp intelligence and sound judgment.

When I joined Comsat in 1966, Dr. Charyk had been here three years as the Company's founding President. At that time, we were preparing to launch a second generation of Intelsat satellites and starting work on a third. We also were getting ready to begin service from the Paumalu, Hawaii, and Brewster, Washington, earth stations. The Company was young and excited about putting into place the elements of a global satellite network that promised to bring profound changes to the international telecommunications marketplace.

Today, we face a more competitive business environment. And we have been working hard to meet the challenge of building an organization that is flexible and responsive to rapidly evolving customer needs, all the while making sure that our mandated services are as good as they can be. Bringing about such a transformation has produced far-reaching changes in our services, products and corporate culture. But these

changes have not been instituted overnight. Indeed, they have their roots in actions taken initially in the 1960s, some of which bore fruit in the early 1970s, and all of which occurred under Dr. Charyk's leadership.

The innovative Comsat services and products of today are part of the Charyk heritage at Comsat. Among these are Comsat International's Digital Express business communications service, the dedicated private video distribution system that Comsat General built and is operating to serve NBC, and the HI-NET system that Comsat General developed in concert with the Holiday Corporation to bring television entertainment to the nation's hotels and motels. One of our newest products—Comsat TeleSystems' new earth station in a suitcase—is featured in the pages of this issue of Comsat Magazine. This transportable unit accesses the Inmarsat system with a 35-inch diameter antenna and is compact enough to be carried as luggage on board an airplane.

As the telecommunications marketplace has matured and changed, so too has Comsat. We are building on the solid foundation developed under Dr. Charyk's leadership. Our commitment to providing our customers with effective and imaginative solutions to their communications problems is stronger than ever.

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Cover: A complete earth station that fits entirely within two easily carried, easily stowed suitcases and which connects via the Inmarsat system with the worldwide telephone network—that's what Comsat TeleSystems, Inc., of Fairfax, Virginia, has given the world with its new TCS-9000. The critical role that the TCS-9000 played in Mexico City in the aftermath of the earthquake is covered in an article beginning on page 16. The benefits of the TCS-9000 are discussed in a second article beginning on page 26. Photograph by William J. Megna, Chief Photographer. Model: Eric Rock, Financial Analyst, Comsat Technical Services.

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From the Editor

The feature section of Comsat Magazine No. 17 reflects two purposes: first, to give attention to our new senior management team—Irving Goldstein and Marcel Joseph—and second to look at three exciting new Comsat products and a brand new nationwide service.

Two of our new products—the TCS-9000 earth station in a suitcase of Comsat TeleSystems and the SkyBridge satellite broadcast vehicle (SBV) of Comsat General—distinguished themselves during the aftermath of the earthquake in Mexico, and we are pleased that William J. Megna, our Chief Photographer, was able to be present to record the critical role both products played. We also give attention to the new Starcom interactive data communications system of the CTP Networks Products Division, and we report on the progress of HI-NET Communications, a partnership enterprise of Holiday Corporation and Comsat General, in bringing television programming to the nation's lodging industry.

Our article about the response of Comsat companies to the disaster in Mexico emphasizes the use of the products, their excellent performance under fire and the role of Comsat staff directly concerned with their use. Here it is well to

underscore the very important role of another element of the Corporation, namely the Maritime Services group of Comsat Space Communications Division. Maritime Services, in keeping with Comsat's responsibilities as the U.S. Signatory to Inmarsat, helped all U.S. parties seeking to send to Mexico City or to use in Mexico City earth stations that work with the global Inmarsat system.

For help during photographer Megna's stay in Mexico City, our thanks to Joe Castro, President of World Trade Import/Export, Inc., and to TeleSystems' William H. McGuire and Comsat Laboratories' Ernest P. Ekelman. For help on all aspects of our coverage of TeleSystems' TCS-9000, our appreciation to Edward J. Bender, Jr. Our coverage of SkyBridge would not have been possible without a similar kind of commitment from Comsat General's Tish Fonda. At the Halliburton Company, Robert G. Gallagher was very helpful in supporting our photographic efforts in behalf of Starcom, and this list cannot be complete without an acknowledgement to the District of Columbia Fire Dept., specifically to Lt. Wendell E. Youngblood, Assistant Pilot Roark Shallow and Fire Fighter Patrick Gibbons for helping us show SkyBridge in action.

Stephen A. Saft



N O T E S

Results for the third quarter are presented and explained

For the quarter ended September 30, 1985, Comsat's Consolidated Net Income was \$12.5 million, or \$.68 per primary share. This compares to Net Income of \$12.8 million, or \$.71 per primary share, reported for the third quarter of 1984. Operating Revenues for the 1985 quarter reached \$121 million, an increase of \$17 million or 16 percent over the amount reported for the same quarter last year.

The decrease in Net Income compared to the same quarter in 1984 primarily reflects the adverse impact on Other Income (Expense) of a provision for loss of \$3.9 million taken during the 1985 quarter, partially offset by the absence of losses associated with the Corporation's previous partnership interest in Satellite Business Systems (SBS). This provision to expense interest costs which were capitalized on certain assets not subject to Allowance for Funds Used During Construction (AFUDC) was established earlier this year. Through the third quarter of 1985, approximately \$9.9 million has been accrued for this provision, which equals approximately \$5.7 million after tax, or about \$.32 per primary share.

Third quarter Operating Income increased over that for the same period of the prior year principally as a result of improved performance in the Corporation's Communications Services and Space Communications Divisions. The Communications Services improvement primarily reflects reduced losses associated with the Corporation's direct broadcast satellite business, partially offset by declining performance in the Technology Products division. The Technology Products decline primarily reflects severe price competition for certain equipment product lines, partially offset by improved performance in other equipment product lines.

Losses from Discontinued Operations declined to approximately \$.6 million for the 1985 quarter, from approximately \$1.7 million. Losses related to SBS are reported for the third quarter of 1984 as Losses from Discontinued Operations.

Comsat divested its interest in SBS during the third quarter of 1984. Losses related to Comsat's ownership and September 1985 sale of Environmental Research and Technology and the property associated with that business are reported as Losses from Discontinued Operations.

For the first nine months of 1985, Consolidated Net Income was \$44.6 million, or \$2.45 per primary share, an increase of \$7.8 million or \$.41 per primary share, over the amount for the first nine months of 1984. This increase is principally a result of the absence of losses associated with the Corporation's ownership interest in SBS, reduced losses in the Communications Services Division's direct broadcast satellite business, and increased income from the Space Communications Division's Intelsat and Inmarsat businesses, partially offset by the previously discussed provision and increased equipment manufacturing losses.

Operating Revenues for the first nine months of 1985 were \$362 million, an increase of \$57 million over the amount for the same period in 1984. This increase reflects increased revenues in all three operating divisions.

Interest in three international earth stations to be sold

Comsat will sell to American Telephone and Telegraph Company (AT&T) on January 1, 1988 its 50 percent ownership interest in three U.S. international earth stations for approximately \$55 million cash. Two other jointly owned stations will be closed on January 1, 1987. Comsat will focus its international earth station business on urban gateway earth stations that provide specialized services.

These actions are partially in response to a December 1984 Federal Communications Commission (FCC) decision to permit common carriers to own and operate their own multi-purpose international earth station. The Corporation's actions regarding jointly owned stations are subject to FCC approval.

According to a Memorandum of Understanding (MOU) between Comsat and AT&T, on January 1, 1988, Comsat

will sell to AT&T its 50 percent ownership interest in the Etam, West Virginia; Jamesburg, California; and Roaring Creek, Pennsylvania international earth stations. Comsat will recover its full investment in the stations. Until 1988, the stations will continue to be owned and operated under current arrangements.

By January 1, 1987 two other U.S. international earth stations (Andover, Maine and Brewster, Washington), which were built in the 1960s and which are located far from urban centers, will have been phased out of international switched service. Services currently available through these stations will be provided through other appropriate facilities. Comsat expects to recover its full investment in these stations through accelerated depreciation.

The rate base associated with the jointly owned international earth stations will decrease between now and 1987. This decrease will cause the contributions to Comsat's earnings from these stations to decrease from approximately \$15 million for 1985 to approximately \$6 million for 1987.

"We expect that any adverse impact on our revenues or earnings resulting from this divestiture will be effectively offset by growth in our new international carrier business, Comsat International Communications, and our other businesses. We intend to invest the earnings generated by the earth stations and the proceeds of the sale itself in solid growth opportunities," said Comsat Chairman and Chief Executive Officer Irving Goldstein.

"Our future lies in small, low-cost international earth stations that can be located near our customers and can decrease their communications expenses. This move will assist us in focusing on these facilities," said Comsat International President William Taylor.

ERT sold to Houston firm; Concord property is retained

Resource Engineering, Inc. (REI), of Houston, Texas, has purchased the Comsat subsidiary Environmental Research & Technology, Inc. (ERT), of Concord, Massachusetts. Under the terms of the

transaction, Comsat will retain the land and property of ERT headquarters, which it intends to sell at a later date.

The sale of ERT to REI will result in an after-tax loss to Comsat of approximately \$5.5 million, or about \$.30 per share, during the third quarter of 1985. A gain resulting from Comsat's expected sale of the property associated with ERT is expected to substantially offset that loss during 1985.

Commenting on the sale on the day of the announcement, Comsat Chairman and Chief Executive Officer Irving Goldstein explained, "Today's actions will help us focus upon those businesses that take full advantage of our competitive strengths in telecommunications services and products. Our expertise lies in telecommunications-related businesses, and we are well positioned for continued growth in the years ahead."

Mr. Goldstein also noted, "Resource Engineering is well positioned as a major player in the environmental consulting arena, and the business of ERT will be an important asset to them." Mr. Robert Zoch, President of REI, added, "The combination of ERT and REI creates the largest environmental and engineering consulting firm in the growing field of hazardous waste management."

Compact Software sold to Communications Consulting

Communications Consulting Corporation (CCC) has purchased the Comsat subsidiary Compact Software, Inc. All of Compact's existing product support and maintenance contracts, as well as relationships with its sales representatives, will be continued.

Compact Software, Inc., is the recognized world leader in computer-aided design (CAD) software for the microwave industry. Compact's software runs on a wide range of computers, from large mainframes to super-minis, microcomputers, and stand-alone workstations. Compact's state-of-the-art products have been used throughout the world for more than a decade, and its recently released SUPERCOMPACT PC Version 3.0, an IBM

PC-based CAD product, has been well received by the industry.

Dr. Ulrich L. Rohde, President of CCC and Chairman of Synergy Microwave Corporation and partner of the Munich-based Rohde & Schwarz GmbH & Co. KG, stated, "It is our intention to immediately increase the capabilities of Compact's software products and to incorporate new microwave models."

CCC has, since 1977, developed and sold scientific software, primarily for Hewlett-Packard computers. The acquisition of Compact increases CCC's capabilities in the area of mainframe computer and IBM personal computer products. CCC has an exclusive contract with MCAD, founded by Professors Jansen and Wolf from the University of Duisburg in West Germany; they have agreed to participate in the update and enhancement of Compact products.

Stephen Day, Comsat Vice President of Marketing and Corporate Development, stated, "We are pleased with Dr. Rohde's plans for continued growth and development of Compact Software's products and by the assurance that current Compact customers will have the support services they require."

Quarterly dividend declared

The declaration of a regular quarterly dividend of 30 cents a share, payable Monday, December 9, 1985, to shareholders of record on Friday, November 8, 1985, has been announced. The dividend is the 61st consecutive quarterly dividend declared by the Corporation to its shareholders.

Comsat International, BTI reach operating agreement

Comsat International Communications, Inc., and British Telecom International (BTI) have signed an international operating agreement to provide BTI's SatStream and Comsat International's

DIGITAL EXPRESS services between the United States and the United Kingdom.

The agreement marks a milestone for **Comsat International**; it is the first operating agreement this new organization has signed with an overseas entity. The U.K. and U.S. route is extremely important because of the substantial demand for service between these two countries.

Initial telecommunications services between the U.S. and the U.K. will be provided using the Comsat International earth station located in London at bit rates from 64 kilobits per second to 2.048 megabits per second. Next year **Comsat International** will also begin to provide similar services from several other U.S. locations including Washington, D.C.

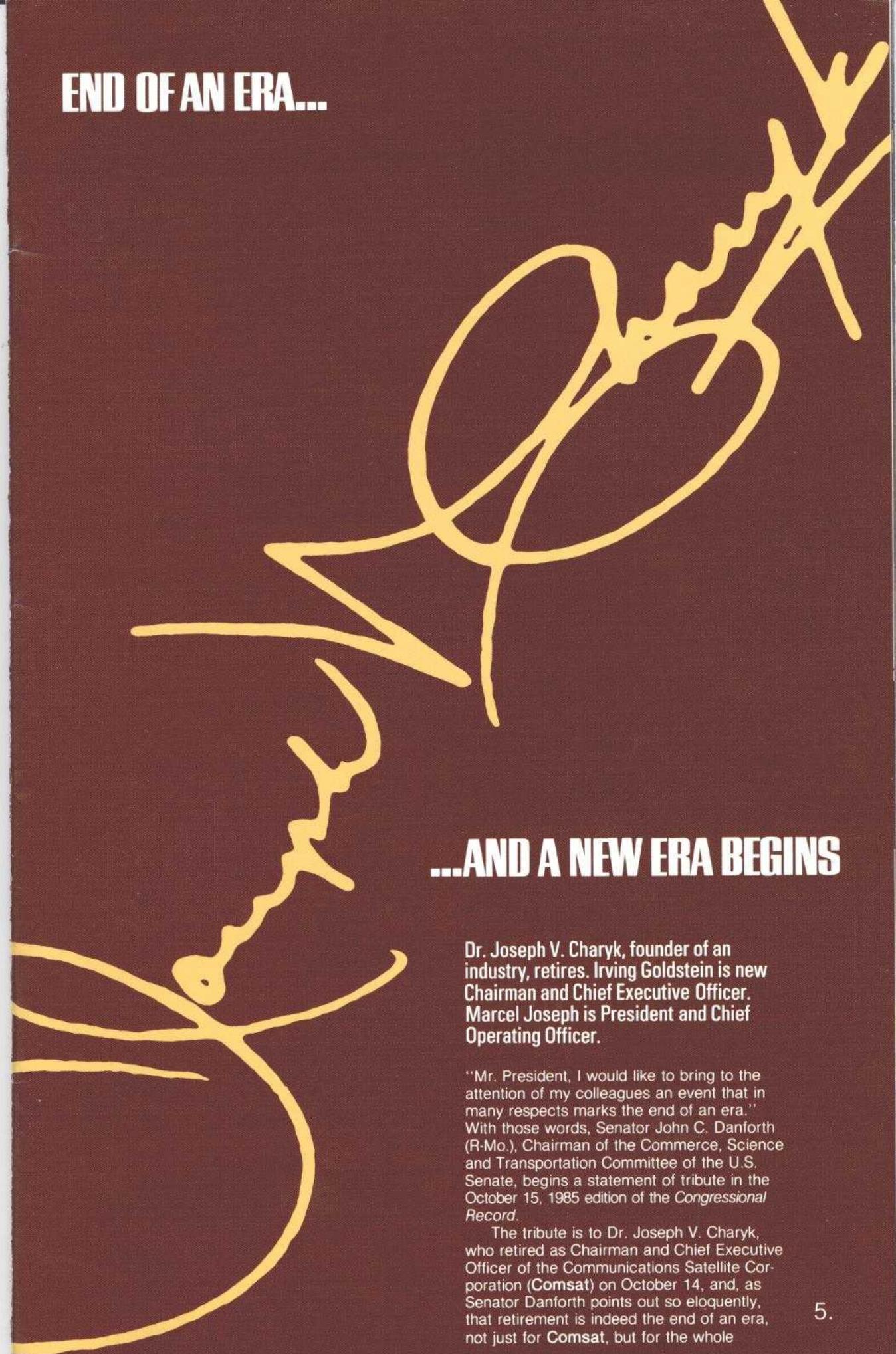
Commenting on the agreement with British Telecom International, William Taylor, President of **Comsat International**, remarked, "We are delighted with this agreement. It will allow us to fulfill our commitments to customers, the first of which is Merrill Lynch. We are also on the threshold of concluding similar arrangements with other signatories or administrations in order to satisfy the future requirements of potential customers."

"We are pleased to be able to link our SatStream (IBS) service to **Comsat International's** Digital Express," said Mike Ford, Chief Executive of BTI's International Business Services, "and we look forward to working together in providing this exciting new digital facility."

Under the agreement, **Comsat International** will be responsible for services to and from the satellite to customer locations in the United States, and BTI will be responsible for providing services for customers in the United Kingdom.

Comsat International Communications, Inc., is a new, wholly owned subsidiary of **Comsat** created to conduct its international earth station operations and act as a retail common carrier providing international communications services.

BTI is the division of British Telecommunications plc responsible for developing, marketing and operating the company's international communications services. In the U.S., BTI has established a subsidiary company, BTI Inc., to provide



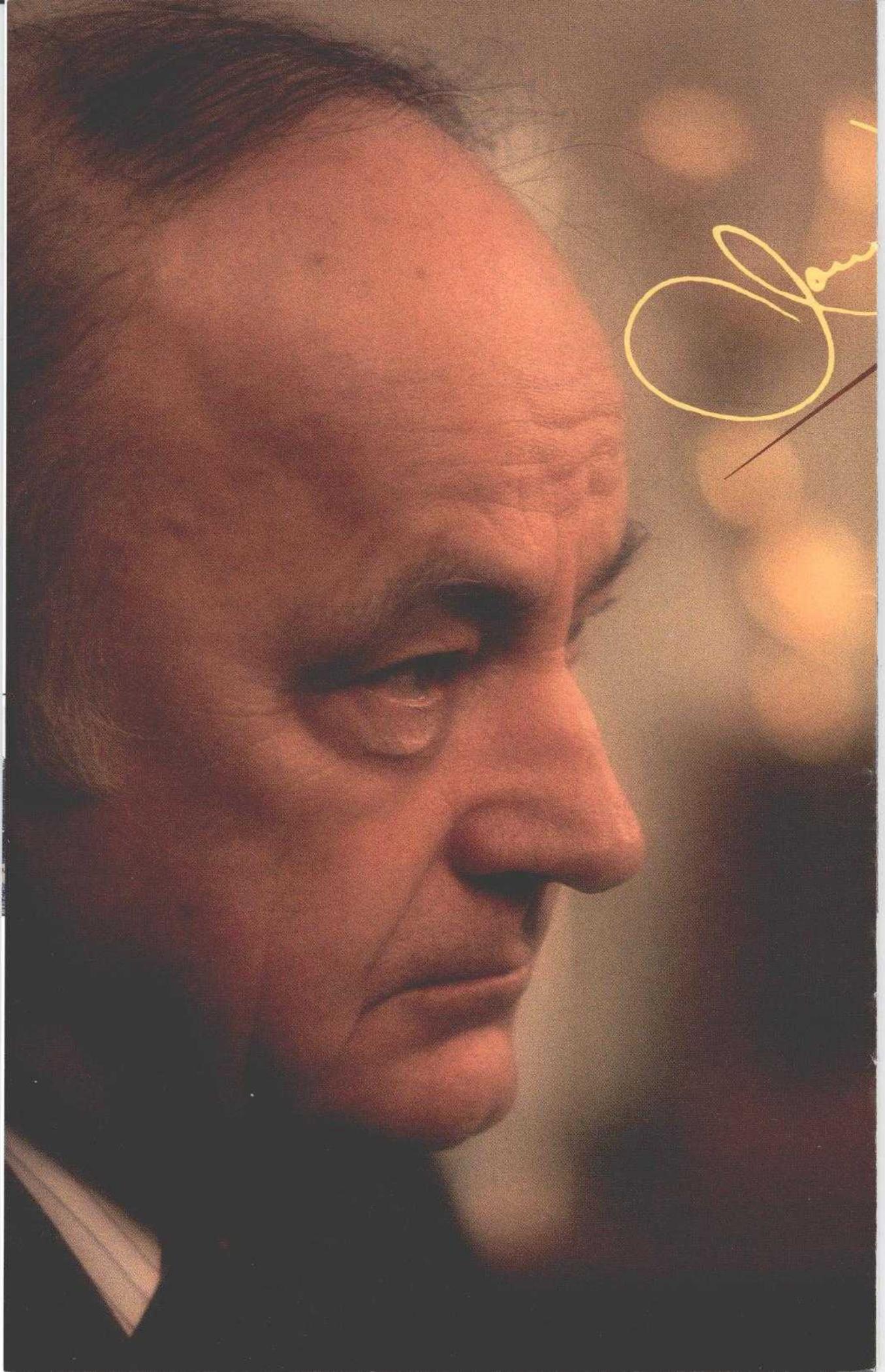
END OF AN ERA...

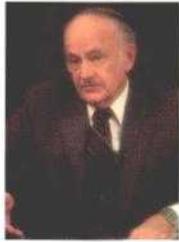
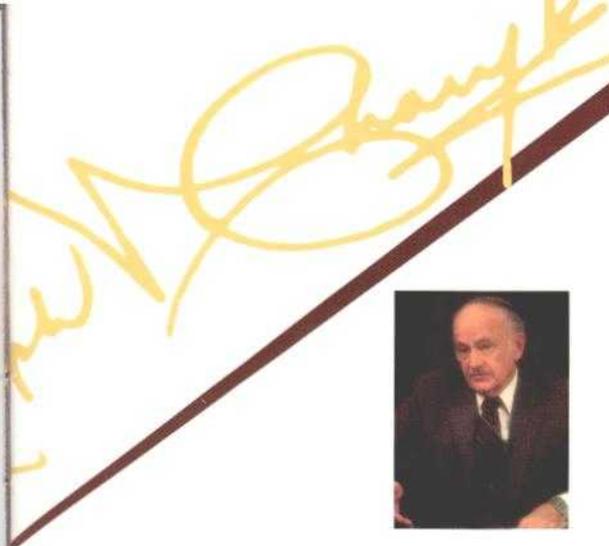
...AND A NEW ERA BEGINS

Dr. Joseph V. Charyk, founder of an industry, retires. Irving Goldstein is new Chairman and Chief Executive Officer. Marcel Joseph is President and Chief Operating Officer.

"Mr. President, I would like to bring to the attention of my colleagues an event that in many respects marks the end of an era." With those words, Senator John C. Danforth (R-Mo.), Chairman of the Commerce, Science and Transportation Committee of the U.S. Senate, begins a statement of tribute in the October 15, 1985 edition of the *Congressional Record*.

The tribute is to Dr. Joseph V. Charyk, who retired as Chairman and Chief Executive Officer of the Communications Satellite Corporation (Comsat) on October 14, and, as Senator Danforth points out so eloquently, that retirement is indeed the end of an era, not just for Comsat, but for the whole





A Letter from President Ronald Reagan

September 13, 1985

Dear Dr. Charyk:

I am pleased to congratulate you on your retirement as Chairman of the Communications Satellite Corporation, Comsat. More than two decades ago, you undertook an important assignment from President Kennedy and under your leadership Comsat began to develop the commercial potential of satellite technology.

Your vision and drive created a global satellite system which has become a tool for the benefit of all mankind and has given birth to our modern communications satellite industry. Thanks to your dedication, our world is now linked together by a communications system which has turned dreams into the reality of progress.

Again, I congratulate you on your distinguished career, on your accomplishments, and on your major contributions to this nation. Thank you and God bless you.

Sincerely,

Ronald Reagan

A Letter from Vice President George Bush

September 11, 1985

Dear Dr. Charyk:

I am pleased to join in congratulating you on your retirement after more than 22 years with Comsat.

Few people have the satisfaction of rising to the top of their industry. Fewer still can be considered among the industry's founders and driving forces. You can lay claim to both of these achievements. Without you and your vision, it is unlikely that people around the world would enjoy the diversity of satellite services that are available today.

Barbara and I send very best wishes as you turn your energies to new adventures.

Sincerely,

George Bush

worldwide satellite communications industry.

On March 10, 1963, Dr. Charyk was elected President of the newly created **Comsat**. For the next twenty-two plus years, he would lead the Corporation in its quest to achieve three principal goals (and a host of subsidiary ones): first, to create a communications system based on satellites that would be useful to peoples of all nations of the world; second, to create an international administrative body to operate the worldwide system; and third, to make a profit for its shareholders. All three goals have been met—and met with unqualified success. A company came into being to foster a new technology. Its success inspired the creation of an entire multibillion dollar industry. Now the man who, more than any other, symbolizes both the company and the industry has stepped down.

Dr. Charyk's retirement at **Comsat's** mandatory retirement age of 65 is not, in fact, a severing of his influence on the Corporation's future direction. He continues to serve on the Board of Directors. Thus his counsel continues to be available to the Corporation's new senior officers team—Irving Goldstein and Marcel Joseph. Mr. Goldstein, a **Comsat** employee since 1966, assumes Dr. Charyk's position of Chairman and Chief Executive Officer. Mr. Goldstein was elected President of the Corporation in 1983 and just prior to that was Executive Vice President.

Elected President and Chief Operating Officer, Mr. Joseph is a 24-year veteran of General Electric Corporation. His last job with GE was that of Vice President and General Manager of the Transportation Products Division. He joined **Comsat** in April 1985 as Executive Vice President.

In the weeks prior to Dr. Charyk's retirement, many people came forward to express their admiration for his many accomplishments. **Comsat Magazine** is pleased to reprint two such statements—one from President Ronald Reagan, the other from Vice President George Bush—and to carry the full text of Senator Danforth's tribute in the *Congressional Record*.

Following the statements, we publish question-and-answer format interviews with the two members of the new **Comsat** senior management team, Chairman and Chief Executive Officer Goldstein and President and Chief Operating Officer Joseph.

Photography by William J. Megna,
Chief Photographer, Comsat Magazine.



**Insertion in the Congressional Record of
October 15, 1985 by Senator John C. Danforth**



Mr. President, I would like to bring to the attention of my colleagues an event that in many respects marks the end of an era. Yesterday, October 14, 1985, Dr. Joseph V. Charyk, chairman of the board of directors and chief executive officer of Communications Satellite Corp. (Comsat), retired. His departure comes after more than 40 years of distinguished service to his country and to his chosen fields of aerospace and telecommunications.

This remarkable man's contributions to telecommunications are such that people the world over who today enjoy the benefits of satellite telecommunications services have been affected by his activities. For over two decades, Joe Charyk, as the chief officer of Comsat, has helped to guide and direct the development of the modern world of satellite communications. From its formation in 1963, to the 1965 launch of Early Bird, the world's first commercial communications satellite, to the present era of modern high-powered communications satellites, under the leadership of Joe Charyk, Comsat has had a prime role in advancing the state of the art. In addition, Joe Charyk was instrumental in the establishment and development of the International Telecommunications Satellite Organization, Intelsat, which started with just a few nations, has grown to a 110-member organization which today is providing a full range of communications services throughout the world.

Mr. President, Dr. Charyk began his distinguished career at Comsat in 1963 when President John F. Kennedy asked him to serve as chief operating officer for the then fledgling new company created by Congress in the Communications Satellite Act of 1962. The corporation had as its mandate the establishment of a global satellite communications system, and President Kennedy felt he had located the right man for the job. Indeed, Dr. Charyk's credentials were impressive.

Before joining Comsat, Dr. Charyk was with the U.S. Air Force as Chief Scientist and Assistant Secretary for Research and Development in 1959, and Under Secretary from January 1960 until February 1963.

In 1955 he served as director of the Aerophysics and Chemistry Laboratory of Lockheed Aircraft Corp. In 1956 he was with Aeronutronic Systems, Inc., a subsidiary of Ford Motor Co., as director of the Missile Technology Laboratory and later became general manager of the space technology division.

From 1943 to 1946 he was an engineer with the Jet Propulsion Laboratory at California Institute of Technology and was an instructor in aeronautics at California Institute of Technology in 1945. From 1946 to 1955 he was a professor of aeronautics at Princeton University, where he helped establish the Guggenheim Jet Propulsion Center.

Mr. President, Dr. Charyk's educational achievements match his professional accomplishments. He holds a B.S. degree in engineering physics from the University of Alberta, an M.S. in aeronautics, and a Ph.D. in aeronautics, magna cum laude, from California Institute of Technology. He also holds an honorary LL.D. from the University of Alberta and an honorary Dr. Ing. from the University of Bologna.

He is a fellow of the American Institute of Aeronautics and Astronautics and a member of the National Academy of Engineering, the International Academy of Astronautics, the National Institute of Social Sciences, a fellow of the Institute of Electrical and Electronics Engineers, a member of the National Space Club, and the Armed Forces Communications & Electronics Association.

In April 1984, Dr. Charyk was appointed Chairman of the National Telecommunications Security Advisory Council by President Reagan. He is also the recipient of numerous awards including the Distinguished Service Medal, the Guglielmo Marconi International Award, and the Goddard Astronautics Award.

Mr. President, through his role in the development of international communication satellites, Dr. Charyk has had a positive impact on efforts to make our world a better place in which to live. He has helped to make the concept of a global village a reality.

Following his retirement, Dr. Charyk will continue to serve as a member of the board of directors of Comsat and will pursue other interests in telecommunications.

Mr. President, the formation of the Communications Satellite Corp., and the realization of its mandate to achieve a global communications satellite system was an immense undertaking. There were many in Congress who wondered if the United States had set a goal that was unattainable. Joe Charyk saw to it that the United States met this challenge. It is with pride that I take this opportunity to recognize him for his achievements.



AN INTERVIEW WITH...

Chairman and Chief Executive Officer

Q: How has your past experience helped prepare you for your new position at Comsat?

GOLDSTEIN: Over the last half a dozen years or so I have been involved in virtually every single one of Comsat's activities. Of course I grew up with our regulated business, which remains—and will remain for some time to come—the largest and most profitable part of the Corporation. But I think I have a well-rounded background and considerable exposure to each one of Comsat's present activities.

Also I ought to point to my exposure to the people of the Corporation—not only at the senior executive level but down through the ranks, at least down to what I would call the

middle level of management. Over the past years, I have had exposure to virtually everyone in that middle management level and up. I know them, their capabilities, their dedication and their expertise, and I think they know me well enough to understand what I'm capable of. The working relationships will continue to be very, very good.

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Q: As you look back on Comsat's 22 years of history, what kinds of things strike you as most noteworthy?

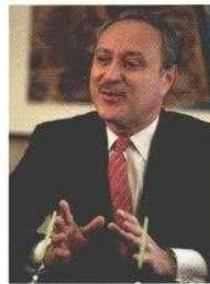
GOLDSTEIN: There have been so many noteworthy developments that it is difficult to know where to begin. Next in importance to the creation of **Comsat** itself as a result of the Government's decision to privatize this incredible technology—and that was a major, major decision on the part of the United States Government—is the creation of the global system, the bringing of the technology to all the nations of the world—large and small, rich and poor, near and far. That is one of the great events of the century and certainly an enormous tribute to the Government.

When you assess the achievements of **Comsat**, you have to say that **Comsat** has played—and is continuing to play—an important role in changing world culture. I really don't think that that is too broad a claim. Communications is the first step toward understanding. Potentially contentious differences can be kept from getting worse. Physical distance between nations alone no longer can be blamed for the birth of disharmonies. When, for example, billions of people view an Olympic Games telecast on their television sets, brought to them via the Intelsat system, there is the possibility that many of those people will feel some sense of the common connections of all humankind.

Satellite communications is also helping businesses operate more efficiently on a worldwide scale as well as within their home countries. Bringing people closer together and the improved operations of business everywhere are outgrowths of commercial satellite communications technology, and this **Comsat** has brought to the world.

One specific achievement that deserves to be singled out was the creation of **Comsat Laboratories**. This outstanding center of satellite communications research and development has been directly responsible for the enormous increase in communications capacity in space and the attendant decreases in the cost of using that capacity. I think that it is interesting to note that our decision to enter the manufacturing business was motivated by our desire to bring to the marketplace the benefits of **Comsat Laboratories** R&D in the realm of communications hardware.

Another major step for us was the decision back in the early 1970s not to limit ourselves only to the jurisdictional business but rather to begin to branch out into other non-jurisdictional areas, some of them regulated by the FCC, some of them not. I am referring, of course, to the creation of **Comsat General**, which has been quite successful and profitable. We wanted to bring the benefits of satellite communications not only



to the international community but to domestic customers as well. We've always felt—and the U.S. Government agreed—that this was consistent with our basic charter, certainly not inconsistent with it. Also, if **Comsat** was to thrive, if we were to have the expertise that we needed, if we were to have the reservoir of employees required to perform the total job, we needed to reach a certain critical mass as a corporation. The jurisdictional business alone would not have allowed us to do that.

Q: Are there personal qualities about Dr. Charyk's leadership during the last 22 years that you might want to comment on?

GOLDSTEIN: In Dr. Charyk, we have a man who has been called "the father of an industry." Indeed, he has led **Comsat** from the very beginning, combining the vision and practical know-how to make the company prosper.

Of his personal attributes, I'd have to say that he is the most intelligent person I have ever had the opportunity to work closely with. One of his most impressive characteristics is his ability to analyze *any* situation quickly and to be able to identify all the options. Whether he's dealing with a technical problem, whether he's dealing with a marketing problem or legal problem, he can quickly and easily identify all the pitfalls and all the opportunities. For a businessman, that's an amazingly important characteristic to have. And that's only one of his many assets.

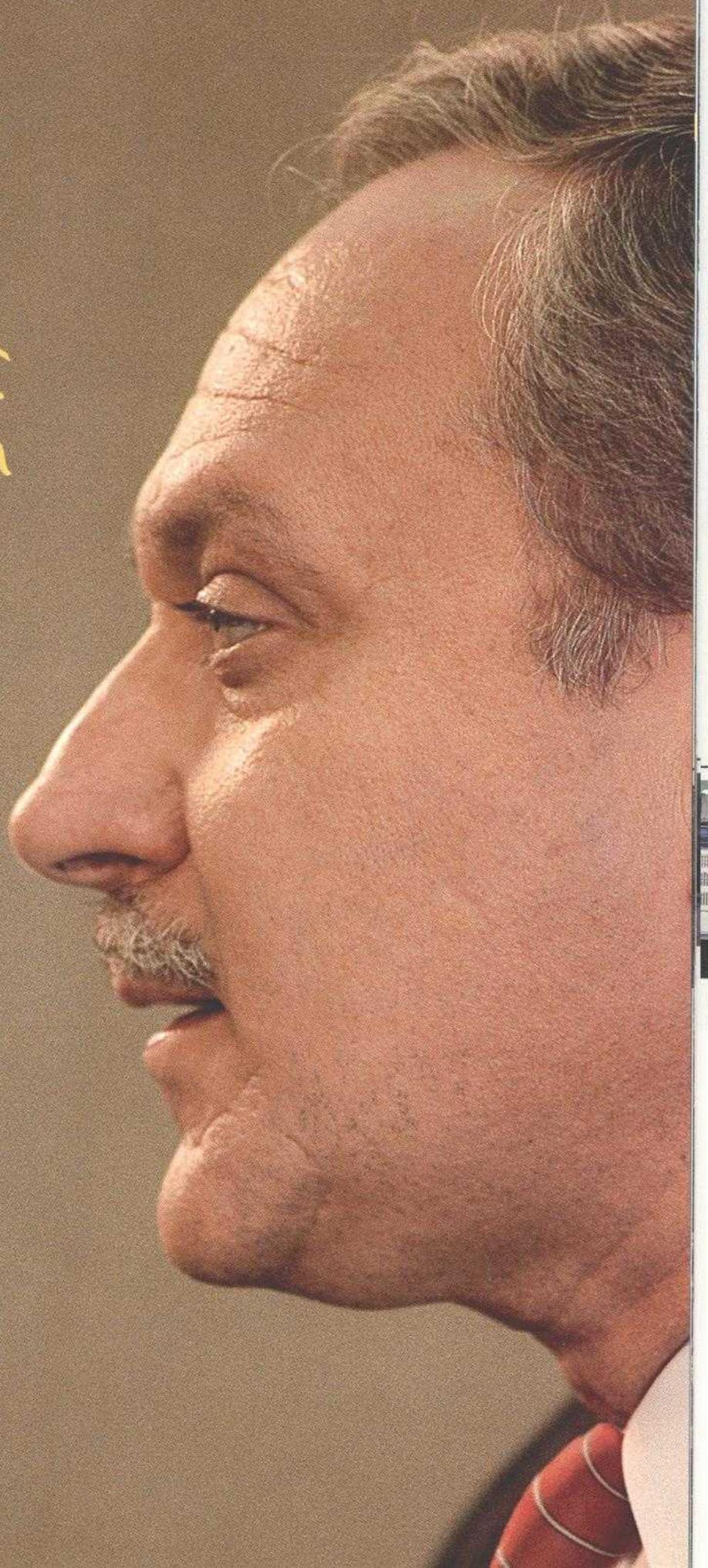
He is an extremely hard-working man, who, I think, gets bored when he doesn't have 50 or 100 things to occupy himself with. He is absolutely indefatigable. I've never seen him act tired. I've never seen him give up on a situation or problem. I've never seen him act in any other way when faced with a problem except to say, "This is something we have to wrestle to the ground." That sets an awfully good example to the rest of the Corporation. He's also a marvelous speaker, the best extemporaneous speaker I've ever seen.

I think I've just identified an awful lot of characteristics that are essential to being a successful CEO, which Dr. Charyk certainly has been.

Continued next page



Halstein





Q: In what ways will the accomplishments of the past be of benefit to you during your tenure of leadership?

GOLDSTEIN: The Corporation under the leadership of Dr. Charyk in these 22 years has built an amazing reservoir of goodwill among a growing coterie of customers. There is literally a huge amount of confidence in **Comsat's** technical abilities on a worldwide basis. That is so very important. **Comsat** is understood to be a corporation that does things the right way, always provides a quality product whether it's a service or a piece of hardware. Obviously that is an extremely important asset of this Corporation and one that I would strive to maintain during my tenure, and I know it's one that Marcel Joseph and the whole senior management team feel very strongly about. That's part of our legacy.

Q: What changes are taking place, and what changes need to take place to make it possible for the Corporation to meet and overcome the challenges ahead?

GOLDSTEIN: The world of telecommunications—both products and services—is more competitive today than it ever was in the past and, as we look ahead to the tomorrows, will become increasingly competitive. Therefore, **Comsat** must learn to live in an ever more competitive world. Having said that, let me quickly add that **Comsat** has faced competition from the moment it came into being.

It has been said of us that **Comsat** is like a utility. I have never liked that analogy. I never felt that so-called complacency that is supposed to be endemic to the utility business. What we faced initially may have been called "modal competition," but it was competition, and it forced us to fight like hell to demonstrate the supremacy and the versatility of satellite communications versus other modes—versus submarine cables, versus terrestrial communications. We fought equally hard to demonstrate the cost-effectiveness of satellite communications versus all other types of communications. We have won many of those battles, but this is not a stagnant situation. We have to refight these battles and rewin them constantly in the marketplace.

While continuing to wage the on-going battles, we also have to work on the new challenges. We have to learn to choose our introduction of new products and new services more effectively. That's one key to the future success of the Corporation. And we have to confront head on the fact that competition in the jurisdictional area is increasing many many fold.

With the introduction of optic fiber cables under the oceans of the world around the corner, with the Commission having recently authorized separate satellite systems, we have to be extremely conscious of the needs of our customers with respect to our Intelsat and Inmarsat services. The introduction of new services in response to customer needs and vigilance about the cost-effectiveness of all services are going to be the key to the growth of the jurisdictional areas of this Corporation.

Q: The final question. What will the Comsat of the 1990s look like if you are successful in bringing about the changes that you believe are necessary?

GOLDSTEIN: The **Comsat** of the 1990s will have the same inherent compartmentalization with respect to its jurisdictional and non-jurisdictional businesses, partly as a result of our desire to isolate them one from the other, partly because the FCC wants them so isolated. The total pie that the jurisdictional services are a part of, namely international telecommunications and information services, will grow very dramatically, and **Comsat** will garner an important share of that growing market. However, I think the Corporation will look quite different by the time the next five to seven years have gone by, principally, because the non-jurisdictional areas will become an increasing part of the Corporation.

Today about half of our revenues are jurisdictional and half are non-jurisdictional, but a much greater proportion of our net earnings or profits come from the jurisdictional area—perhaps 80 percent.

From here on, I expect to see a faster growth rate in the competitive businesses than in the regulated business. The jurisdictional business will continue to grow, of course, but not as fast.

In order for our profits to grow at the rate we'd like, we must capitalize on the growth that's expected in the competitive businesses. Within the next few years I expect our competitive businesses to be larger and more profitable than our jurisdictional business.

That means we are going to see substantial growth in the next five to seven years in the newer areas. We will see a larger specialized manufacturing activity. We will see a much larger non-jurisdictional competitive service activity through **Comsat General Corporation** and through **Comsat International Communications, Inc.** Each of them will grow significantly and at a very rapid rate during the next five years. That's the type of **Comsat** that I see by the early 1990s. Bringing it about will entail changes that are really quite exciting to contemplate.



AN INTERVIEW WITH...

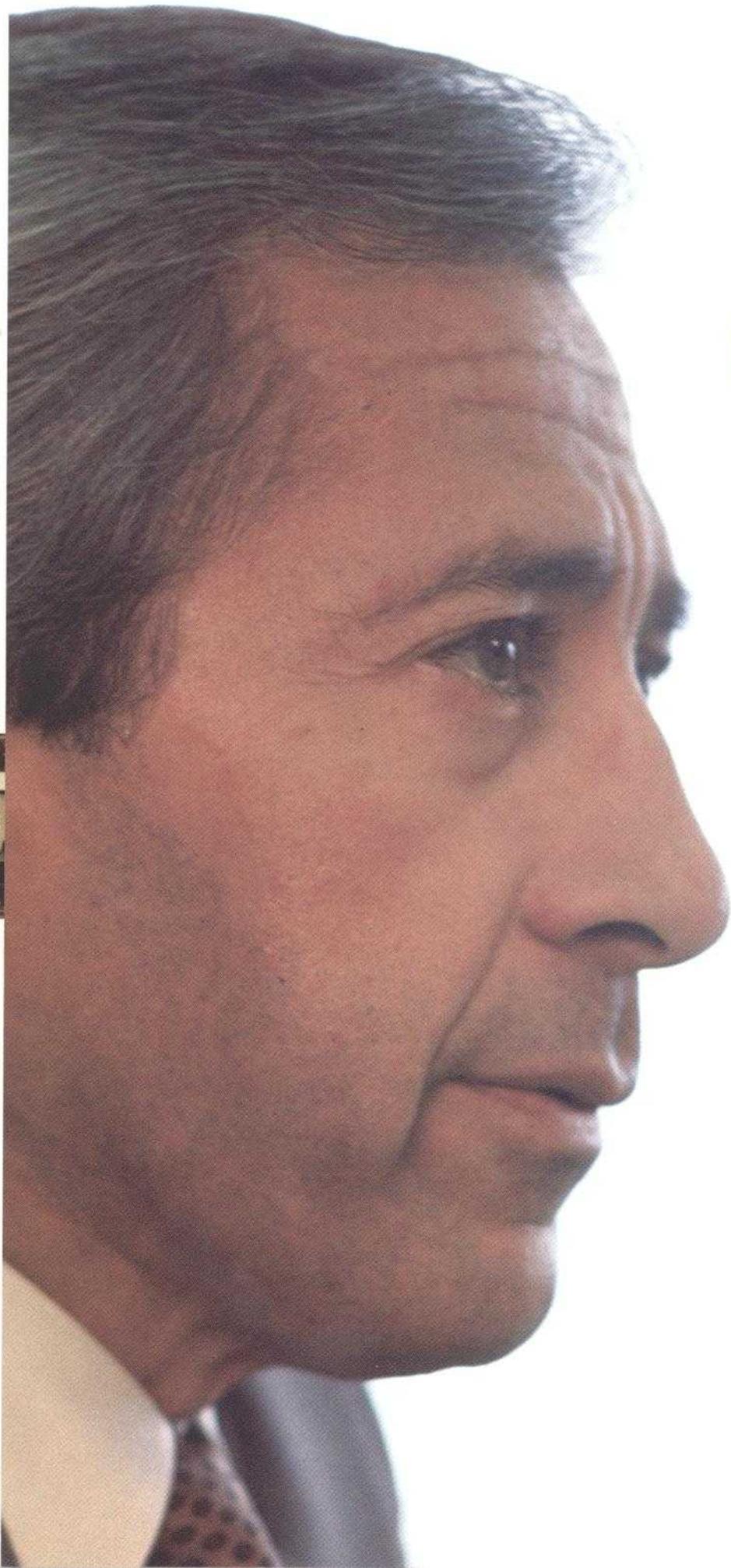
Joseph J. Dowling

President and
Chief Operating
Officer

Q: How has your past experience helped prepare you for your new position at Comsat?

JOSEPH:The big challenge we face is being able to transform **Comsat** from a company almost exclusively involved in a rate-regulated or jurisdictional business into a company that is competitive in every respect. My experience in the last 25 years has been in businesses that were highly technical, highly market oriented, and highly cost competitive. I believe that this kind of orientation is enabling me to play an important role in finding new business opportunities for **Comsat** and making those changes in our operations, in our culture, and in our structure so that we can become a company that is market driven, a company that is fully competitive, a company that lives in a world where costs cannot be passed on to the user.

Continued next page



Marcel

J.P. Joseph



As for my personal accomplishments, I might point to the fact that I have successfully managed growing businesses and mature businesses in good times and bad, including two very difficult recessions. Adapting a company to the marketplace often requires redirecting, restructuring and, where necessary, rationalizing them to meet changing needs. I see this as valuable background as we move **Comsat** from this rate-regulated environment into a cost-driven, cost-competitive company of the 1980s and 1990s.

Q: *As you look back on Comsat's 22 years of history, and on Dr. Charyk's leadership during that period, what strikes you as most noteworthy about this company and about him as well?*

JOSEPH: One of the key assets of this company, developed over the last 22 years, is its superb technical capabilities. What we have going for us is **Comsat Laboratories**. It's an enormous advantage. I believe that we have what I would call an unfair advantage over the competition—a perfectly legal, unfair technical advantage over the competition. It's as a result of Dr. Charyk's leadership, as I see it, that these laboratories have grown and flourished and been able to achieve so much. The challenge now is to refocus this immense technical capability in the directions that we need to move to support the competitive businesses.

Speaking personally about Dr. Charyk, I think that the worldwide reputation he has achieved as a leader in the field of satellite technology has been of very great benefit to **Comsat** in general.

Q: *In what ways will the accomplishments of the past be of benefit to you during your tenure of leadership?*

JOSEPH: We are going to be capitalizing on our strong systems and networking technical and operational skills. We have some specific programs already in-house that we can build on—**HI-Net**, **NBC**—and we are working on winning other programs which will utilize those skills. The five-year business plan of **Comsat International Communications, Inc. (CICI)**, is particularly exciting. Basically, we are going to build on our networking and

system design skills in the services business, and we are going to continue to grow our manufacturing businesses.

Q: *What changes are taking place and what changes need to take place, as you see it, to make it possible for the Corporation to meet and overcome the challenges ahead?*

JOSEPH: The biggest change that's taking place is a change in our culture. We're changing from a culture which is driven by the regulated businesses to a culture driven by the market, to a culture driven by cost; to a culture that asks, "What does the customer need? Now what can I as a **Comsat** employee do to address the customer's need—to solve the customer's problem

Q: *Finally, what will the Comsat of the 1990s look like if you are successful in bringing about the changes that you believe are necessary?*

JOSEPH: I look for the **Comsat** of the 1990s to be a billion-dollar-plus corporation, with a significant percentage of its revenues coming from manufacturing and the remainder from the services businesses with the split roughly equal between the rate-regulated and the competitive services activities.

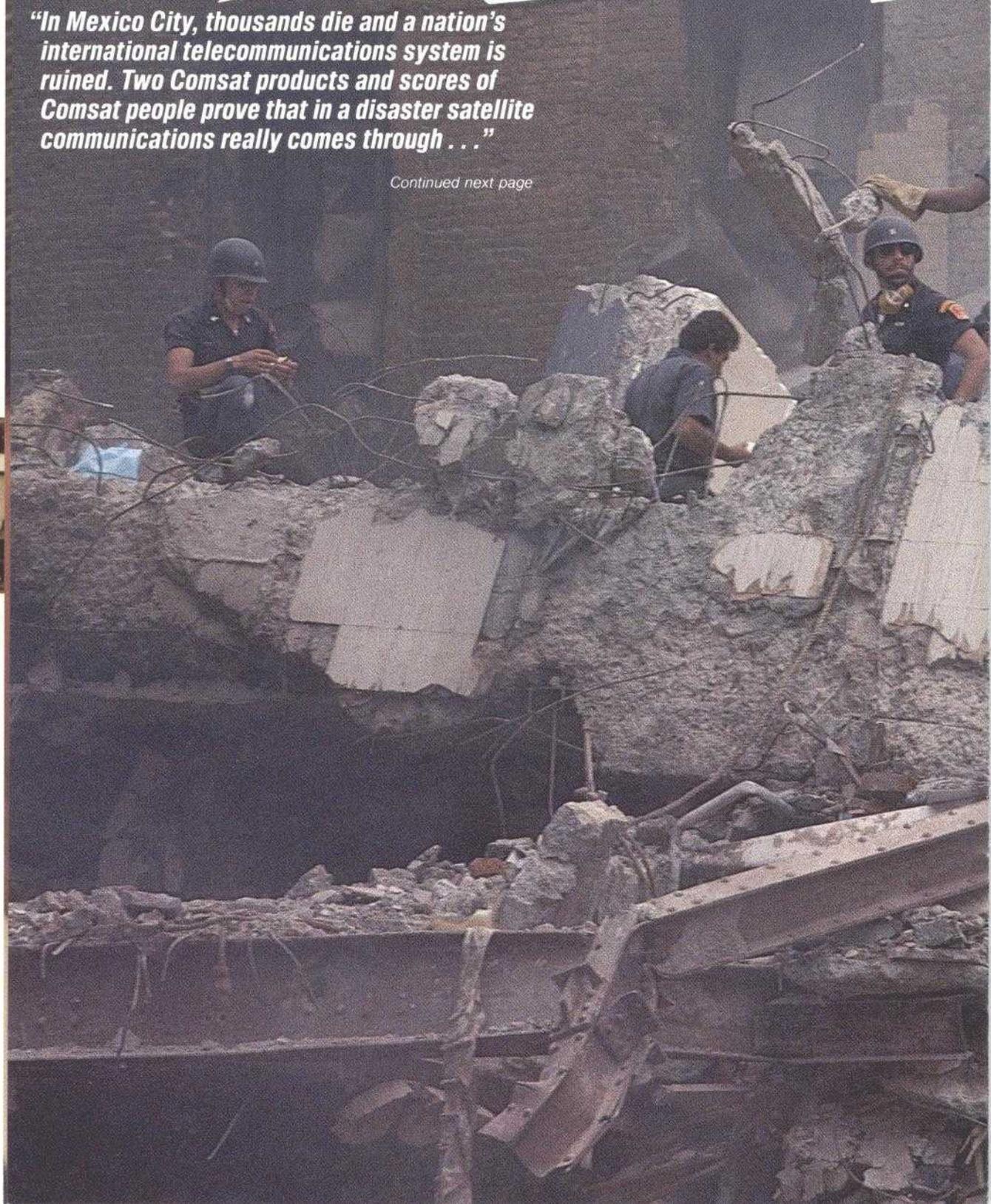
And I'm excited about the many highly talented **Comsat** men and women who are working to make our company grow and prosper in the years ahead.

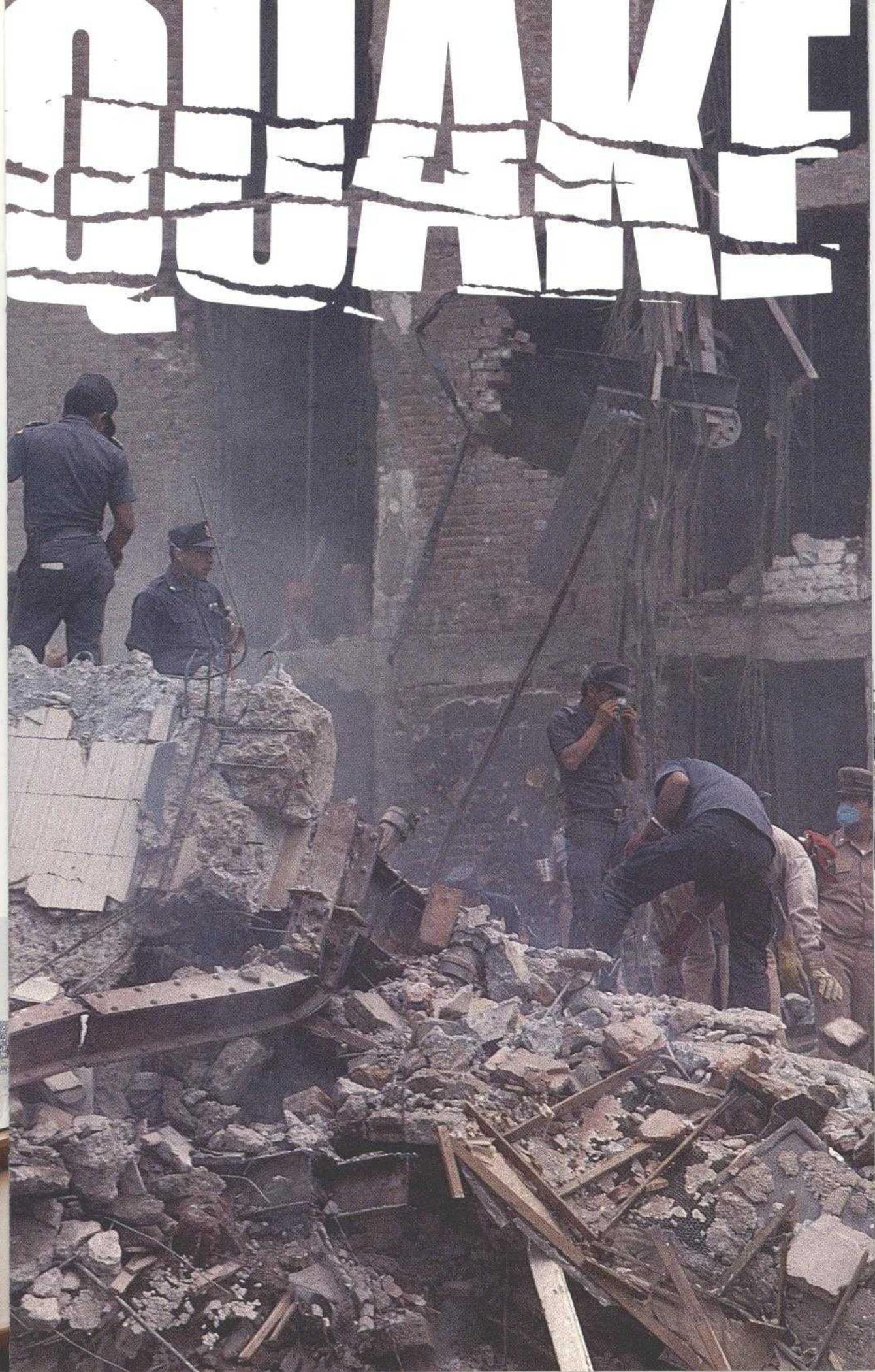


EARTH

"In Mexico City, thousands die and a nation's international telecommunications system is ruined. Two Comsat products and scores of Comsat people prove that in a disaster satellite communications really comes through . . ."

Continued next page





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

Top person coordinating technical operations in Mexico City for the earthquake coverage by NBC News was Robert A. Esbaugh. Esbaugh is seen inside Comsat General's SkyBridge van, which was broadcasting from a location on Jesus and Maria Street around the corner from Juarez Hospital ruins.



Shortly after 7:00 a.m. on Thursday, September 19, the earth shook violently throughout most of Mexico, driving the Richter scale up to a frightening 8.1. When the shaking stopped about one minute later, there were dead and dying in several of the country's towns and villages, but by far the worst hit was that nation's capital.

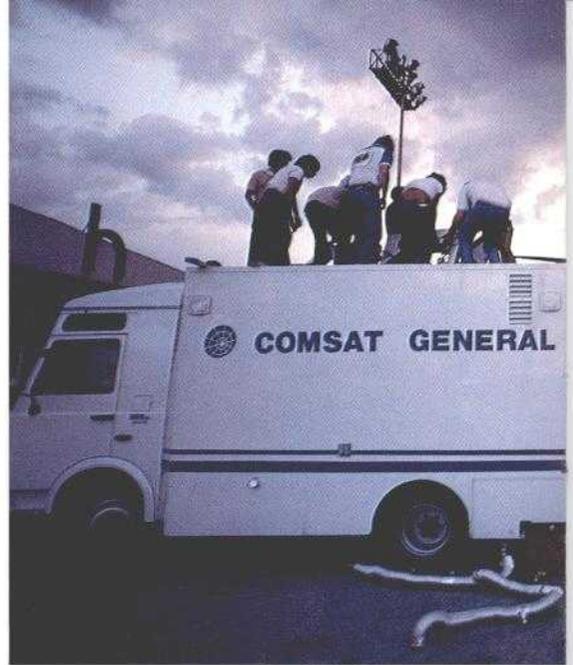
Mexico City, the world's second largest metropolitan area, had suffered the loss of 250 buildings. Another 50 were dangerously close to falling, and about 1,000 more had experienced some form of damage. Two weeks after the disaster the dead were still being counted, a toll that was expected to reach at least 9,000. With the death and destruction came another loss—the nation's international long distance telecommunications system.

Over 24 hours after the first quake—there were a total of at least two dozen aftershocks, of which the worst (7.5 on the Richter scale) occurred 36 hours after the main event—the only reliable long distance communications available to a large part of Mexico was via short wave radio. How was the world to learn what help was needed? What role could satellite communications—and, specifically, **Comsat**—play?

Many different people at many different Comsat business units were asking themselves and each other these questions in the hours after news of the disaster had first leaked to the outside world. Engineers at **Comsat Laboratories** in Clarksburg, Maryland, talked with engineers at Comsat General Corporation in Washington, D.C. Executives at Comsat TeleSystems, Inc., Fairfax, Virginia, talked to executives at Comsat Maritime Services, also in Clarksburg. These were the reactions of people touched by what they knew of the tragedy who strongly believed that satellite communications could play a useful role.

At the same time, the major networks in the United States and other U.S. news organizations were in the midst of their own frantic search to find ways to circumvent Mexico's crippled telecommunications system. It is not surprising that these parallel efforts on the part of **Comsat** and the news organizations would eventually converge. Nor is it surprising that as a result of such a convergence **Comsat** and NBC would be working closely together. **Comsat** and NBC have a track record of cooperation; **Comsat General** is the provider of the dedicated Ku-Band

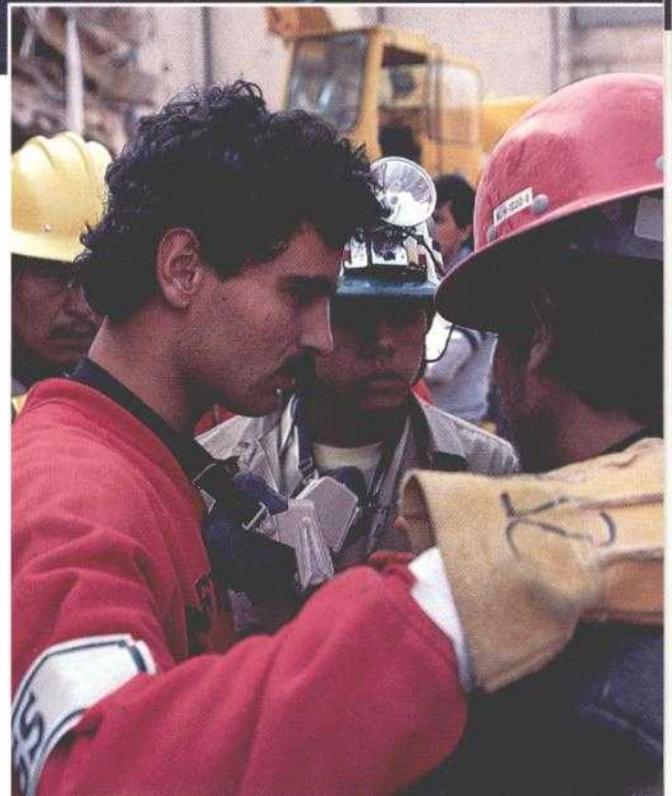
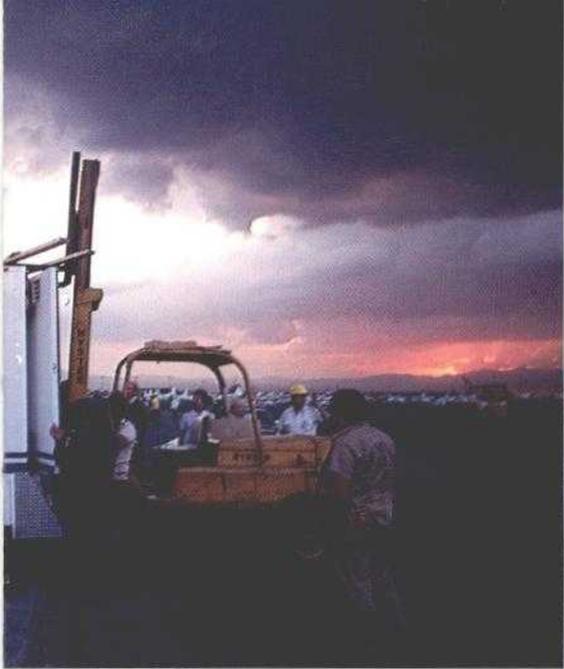
Opening Pages, Rescue team from army of Mexico works feverishly to find survivors among the ruins of apartment house.



satellite distribution service used by NBC and its affiliates. What is extraordinary is that pulling together like this would produce such quick results.

About 36 hours after the main event, the first of three brand new Comsat satellite communications products—the Comsat TeleSystems TCS-9000 earth station in a suitcase—would reach Mexico City. About 24 hours later, **Comsat General's** SkyBridge satellite broadcasting vehicle (SBV) would be on the scene. Another 24 hours later, the second TeleSystem TCS-9000 suitcase unit would arrive.

The story of SkyBridge's trip to Mexico City begins midday Friday (September 20) when alerted by strong expressions of interest by some NBC executives, engineers and technicians working in a facility near Dulles Airport began removing the vehicle's Ku-Band antenna. Crewmen



Top, It's the evening of Saturday, Sept. 21, and SkyBridge has just been unloaded from cargo plane at Mexico City airport. Now dish antenna, removed so that SkyBridge would fit in the cargobay, must be put back in place. Middle, Many cars, hit by portions of falling buildings, were also damaged. Below Right, Volunteers at Juarez Hospital ruins huddle to plan rescue strategies.

Before arrival of Comsat TeleSystems TCS-9000 earth station in a suitcase, NBC was forced to do its communicating with the U.S. via short wave radio. Here short wave operator at Channel 13, Mexico City's only surviving television station, talks with NBC counterpart in Texas.



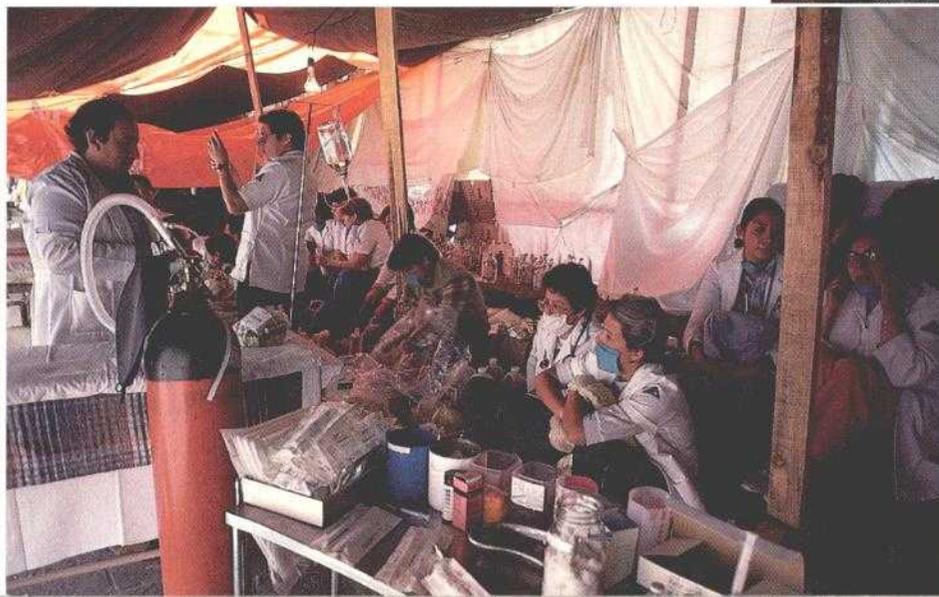
were keeping their respective fingers crossed that, with the antenna off, the vehicle would nest within the confines of a Hercules commercial airliner (C-130) cargobay. That evening, Michael Sherlock, NBC Executive Vice President for Operations and Technical Services, called William L. Mayo, President of **Comsat General**, to confirm NBC's desire to have SkyBridge in Mexico City as soon as possible. Soon, its antenna resting beside it instead of perched on its top, **Comsat General's** new satellite broadcast vehicle would be on the cargo plane flying south.

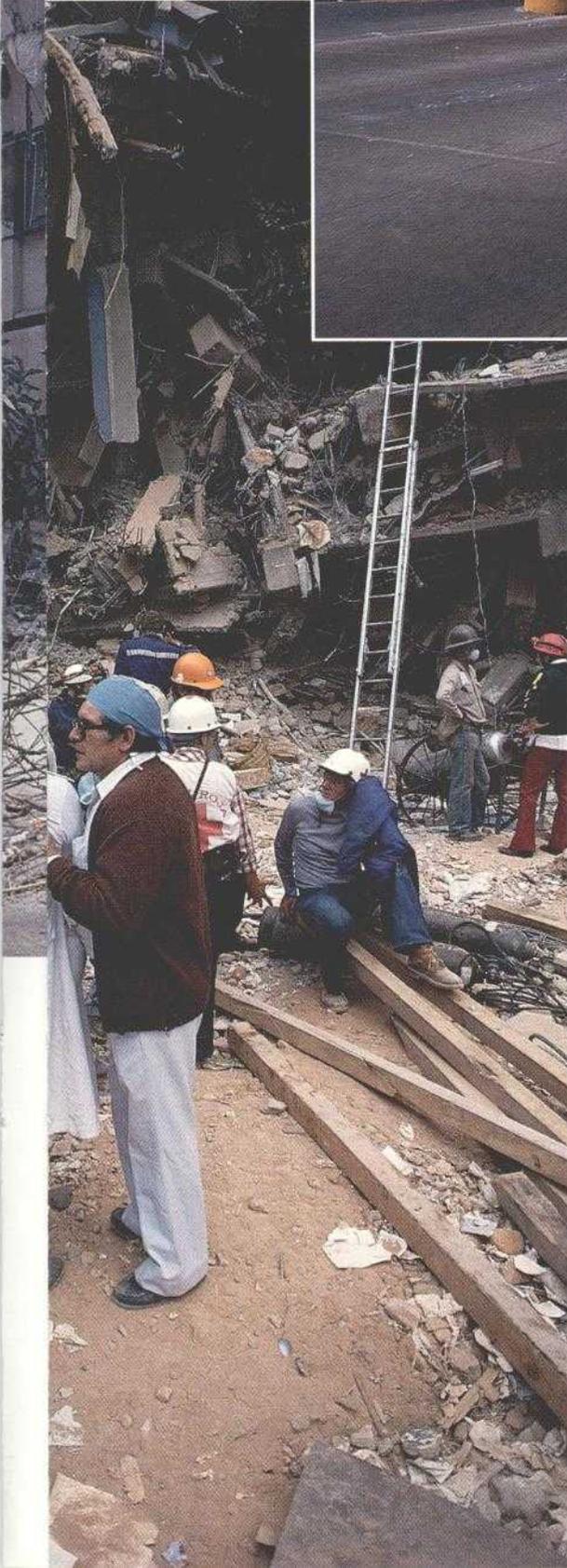
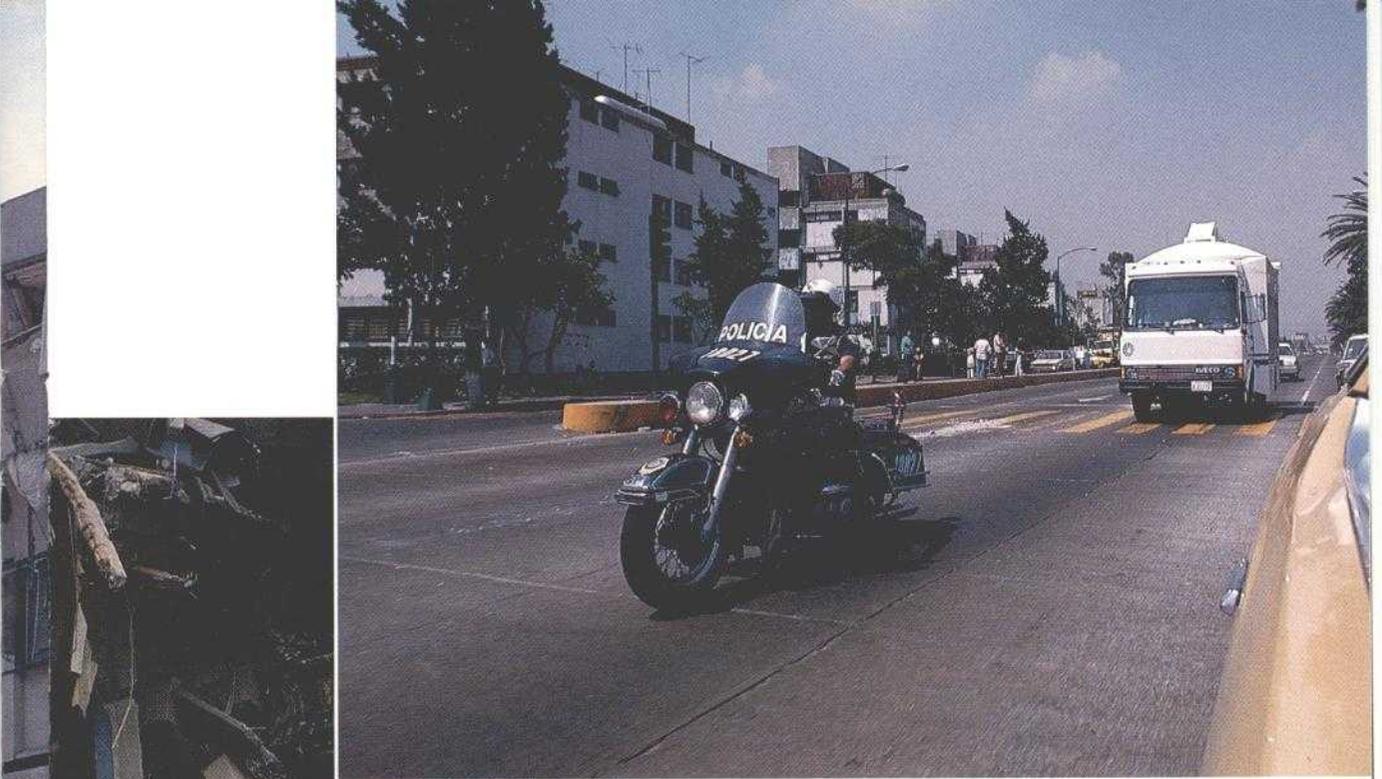
Just a little more than 24 hours after the Sherlock phone call, SkyBridge would be on station in Mexico City, and in the wee hours of Sunday morning (September 22 at 2:01 a.m. eastern standard time) it would establish via Mexico's Morelos satellite a video link with the NBC master control earth station in Burbank, California.

The Comsat General SkyBridge satellite broadcast vehicle would bring the world the first live video coverage of the disaster from its vantage point less than a block from the remains of Juarez Hospital. It was because the van was on site that Americans and people in many other countries were able to watch the desperate search for survivors among the mounds of cement and steel rubble as NBC's Tom Brokaw or ABC's Peter Jennings or another broadcaster talked to us from the scene. When survivors were found—an injured doctor, an injured nurse, babies still in their hospital cribs—it was the van that uplinked the images, and we shared with the people of Mexico the emotional lift of knowing that the relentless rescue efforts of thousands of volunteers were not in vain.

Over a day before SkyBridge arrived, the first of two TeleSystems TCS-9000 satellite earth stations was on duty at Channel 13, Mexico City's only surviving television station. Early on Friday (September 20), an executive of **Comsat TeleSystems** had talked to an executive at NBC about the new suitcase product. Within hours, the network, which had first become aware of the product during the TWA hostage crisis earlier in the year, made the decision that it wanted the system in Mexico City as soon as possible. That first TeleSystems suitcase unit reached its final destination on board a Learjet chartered by NBC.

Below Left, Temporary infirmary set up at site of Juarez Hospital ruins to provide medical aid to survivors and rescuers alike. Below, Medical people and other rescue volunteers at Juarez Hospital site patiently await survivors. Surviving babies were brought down on ladder, rear. Facing Page, Top Right, SkyBridge receives police escort.





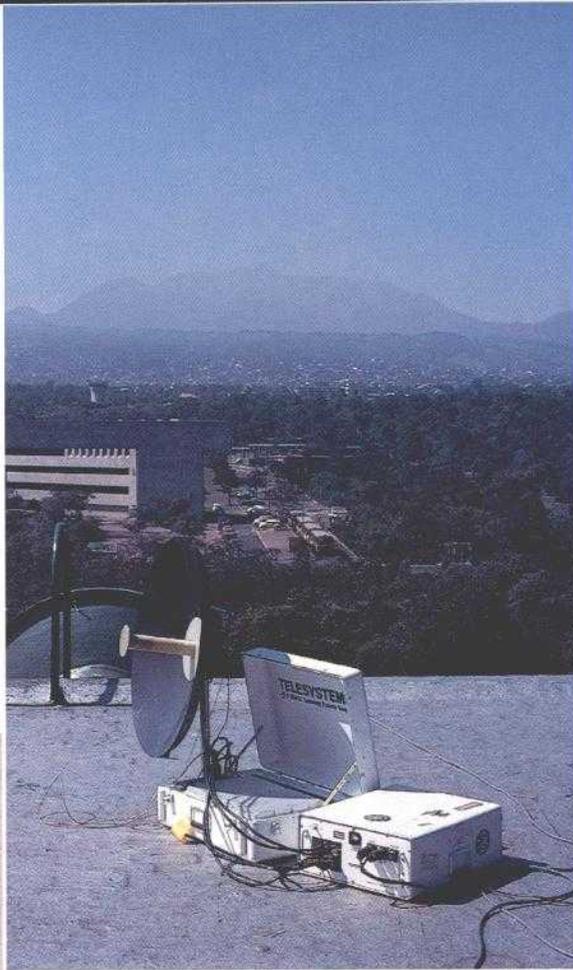
Accompanying the brand new unit was James I. Smith, **TeleSystems'** Senior Technician, Mobile Satellite Systems. Two days later the second TeleSystems suitcase earth station would be on its way to Mexico, this one to be set up in a room in the El Camino Real Hotel.

To get both the TeleSystems suitcase earth stations and the SkyBridge satellite broadcasting van out of the country required obtaining U.S. export licenses, normally a time consuming procedure. NBC News President Lawrence K. Grossman called Secretary of Commerce Malcolm Baldrige directly, and within hours the necessary paperwork had been done.

Equally quick response was needed from the Inmarsat organization in London in order to have the two TeleSystems TCS suitcase units commissioned. The TCS makes use of the global Inmarsat system. "By making something like 100 telephone calls and with the help of Maritime Operations and Inmarsat Relations in our Maritime Services group, we were able to get the suitcase units commissioned in the course of one business day," says **TeleSystems'** Edward J. Bender, Jr., Regional Marketing Manager, Mobile Satellite Systems. "George Tellmann was a tremendous help in bringing this about," Bender adds. (George Tellmann is Vice President and General Manager, Comsat Maritime Services. Comsat is the U.S. signatory to and largest shareholder in Inmarsat.)

NBC was the owner of both suitcase units, but just as with the Comsat General owned SkyBridge van—on loan to NBC, and also used by ABC and 11 NBC affiliates—NBC permitted other organizations to make use of the equipment. In this case the users included radio broadcasters, print journalists as well as television people. And NBC also let people call worried family members back in the United States.

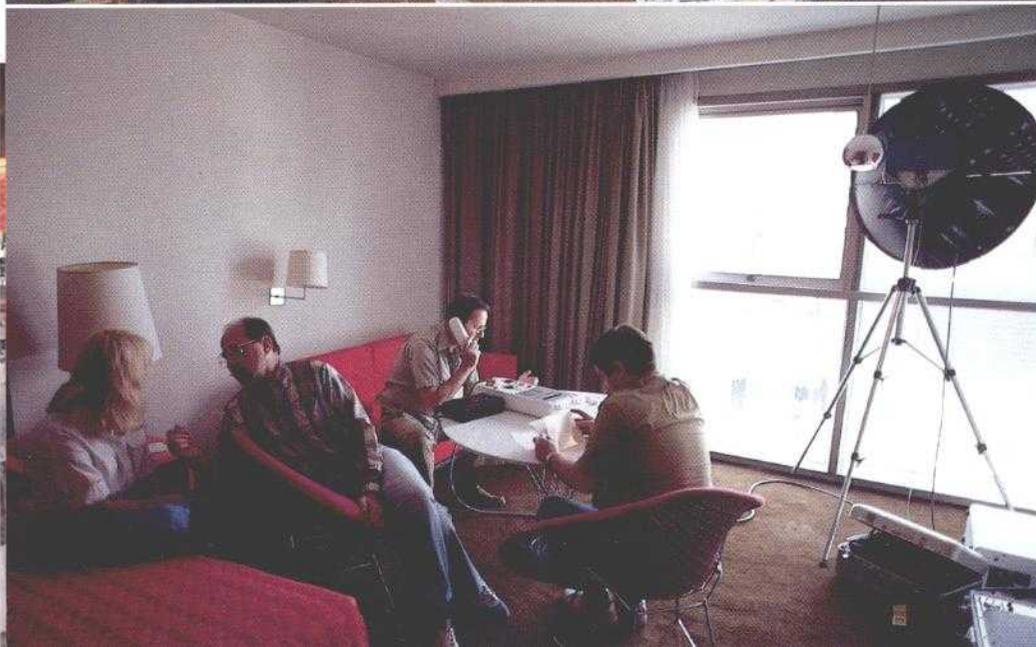
In an article in the September 30, 1985 issue of *Broadcasting*, the weekly magazine, Art Kent, Vice President, Operations, NBC



News, describes the experience of his organization with the two TeleSystems units. Stating that both operated "flawlessly," he then continues, "They're incredible. Our senior producer on the scene, Mauri Moore, called me at home in northern New Jersey. It sounded as if she was right around the corner."

In an interview on the scene in Mexico City, NBC's Mauri Moore made clear how both the Comsat General SkyBridge satellite broadcast vehicle and the TeleSystems suitcase units were used, the earth station telephones supporting the use of the van almost every minute of the day.

Using the telephones, she told us, "we coordinated the feeds" from the van. "I would call my satellite desk in New York on the telephone. At the same time, I would be on a local telephone to the feed point," the van.



"That way I could communicate to New York what they were seeing, whose material it was, whether it was NBC material, ABC material, CNN material or affiliate material." If there were glitches in the taping of the feeds, the people in New York, would tell Moore about it, and in turn using her local communications loop to the van she would tell the crew to "back up" their tape and "feed it again."

Moore adds, "On a personal level, it [the satellite telephone] was a means to get a few messages out for a few people in this city whose families were worried about them." Then she notes, "The telephone really became the most important tool for me here, even more than the truck [the van]. The truck was fabulous for showing that our anchorman was on location...but in terms of facilitating communications the phone was the best thing, the very best thing."



Steve Smith, Assignment Editor with ABC News' Southern News Bureau in Atlanta, played the same role for ABC that Mauri Moore played for NBC, namely that of coordinating producer. Smith told us, "We utilized it [the satellite telephone] to communicate with our offices in New York so that we could tell them what we were planning to do and they could tell us their suggestions for what we should do. It was absolutely essential that we talk with New York... The comments I heard from [the people I was talking to in] New York were, 'It sounds like you're around the corner.' The sound quality was excellent."

NBC's Moore and ABC's Smith did their satellite telephone calling from either Channel 13 or the El Camino Real Hotel. Initially working 24 hour days, or close to it, **TeleSystems'** Jim Smith stayed on duty with the unit at Channel 13. At the El Camino Real Hotel, **TeleSystems'** William H. McGuire, Manager, Maritime Services, who had accompanied the second unit on its trip to Mexico City, was on duty. Both men served as gatekeepers at NBC's request.

"We had a sign up sheet for everyone who wanted to use the telephone," McGuire explains. "You signed up for a five-minute slot, and then you had to be here at your assigned time or you got passed over. We had a line of people waiting in the hall outside the room most hours of the day. One time I counted, and there were 24 people lined up in the hallway. In the room itself we had as many as six people sitting on the bed waiting to use the telephone.

"One fellow came to me to sign up," McGuire continues. "Then he went back into the hall and found himself a chair. He had a little portable typewriter with him, and while he was waiting for his turn to come up he had the typewriter on his knees. He was typing his story as he waited so that he could read it over the telephone when his time came.

"The TCS performed like a total winner the whole time," McGuire notes. "Even when the antenna was facing flat into the sun, it was just great. I know what to listen for, and at those times when the sun was directly on us I could detect a slight increase in noise. The user never noticed a thing. Really, the performance was absolutely outstanding."

Outstanding performance is an equally apt description of **Comsat General's** SkyBridge van. A Comsat engineer who lived with the van for practically its entire stay in Mexico City is Ernest P. Ekelman with the Earth Terminal Antenna Department at **Comsat Laboratories** in Clarksburg, Maryland. Says Ekelman, "It's a tremendous tribute to Jim Delany and the people working with him, who played such a major role in the design of the

Coordinating producers Steve Smith with ABC, on TeleSystems telephone, and Mauri Moore with NBC made extensive use of earth station in a suitcase. Location is a room in El Camino Real Hotel in Polanco-Chapultepec section of Mexico City.



Facing Page, Top, Comsat TeleSystems TCS-9000 earth station in a suitcase set up on roof of Channel 13, Chapultepec section of Mexico City. Middle, Destruction of telephone facilities, such as Telefonico Centro building, caused serious disruption of telephone services for Mexico City residents. Facing Page, Bottom, NBC News correspondent Alan R. Walden calls in his story on TeleSystems unit from room at El Camino Real Hotel.

For the families of suspected earthquake victims the wait for word from rescue crews was painfully long—so long that family members often were too drained to react with anything but tears even to good news.



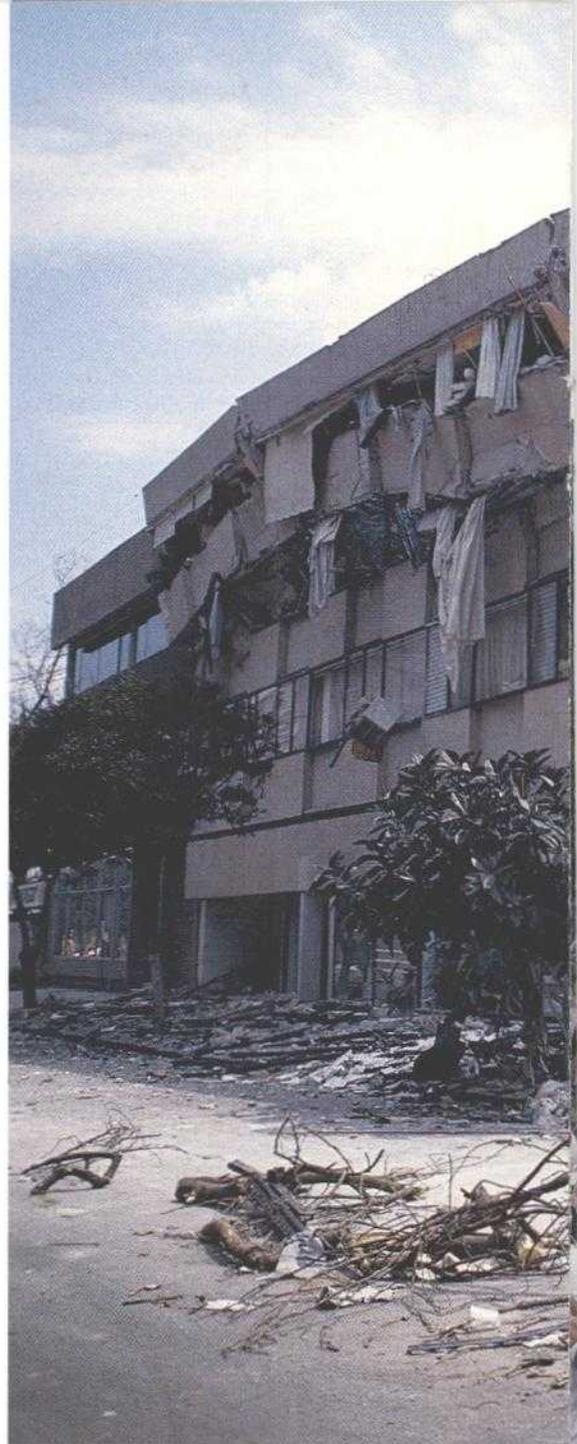
van, how well it came through for us. It is a very well thought out, very well put together package." (James F. Delany is Manager, Antenna Engineering, Comsat General Corporation.)

"When you consider that Mexico City was the very first use of the van in the field and that it worked so very well, you really have to give a tremendous pat on the back to the designer and the design," Ekelman adds. "We took a product that had only recently been put together, and we then proceeded to use it practically 24 hours a day for four straight days. It's amazing how versatile and adaptable the van is."

Ekelman was one of five people who made the trip to Mexico City with the van. He was invited to take part because of his field and antenna experience, but also because he speaks Spanish—and too because of a brilliant stroke of luck that resulted in his having information that would prove invaluable. Six weeks before the first series of violent tremors struck, Ekelman was in Mexico City meeting with engineers of the Mexican government's SCT, the agency charged with managing the nation's telecommunications systems.

Ekelman was brought in to study the feasibility of retrofitting Mexico's single-polarized C-Band Morelos system antennas for dual polarization. During his stay, he was presented with full specifications on the satellite coverage footprints in both the C and Ku Bands of the single Morelos satellite that has been launched so far. This information would prove absolutely critical to the communications engineers at Comsat General Corporation in the hours immediately following the disaster as they were preparing the "communications link budget" (or usage strategy and plan) for the soon-to-be airlifted SkyBridge van. (It is possible that SkyBridge may have been able to use either an SBS or an Intelsat satellite for its uplinks. Either would have entailed considerably more complications, and live transmissions could never have begun as quickly as they did.)

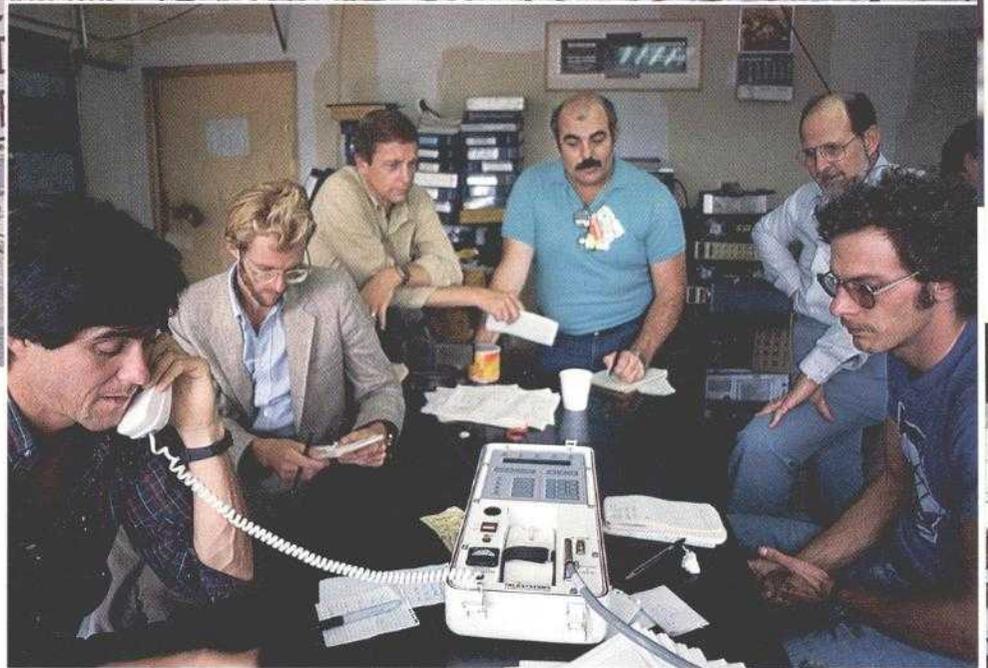
The story of Ernie Ekelman and why he accompanied SkyBridge to Mexico City makes vivid a lesson that emerges clearly from Comsat's experience in Mexico City. That lesson is the paramount importance of a corporation's employees in every aspect of its interaction with the world outside its doors. Comsat is services, and Comsat is products, but it is also people, people who design, build and maintain those products or see to the thousands of details necessary to make certain that services are offered without interruption or delay. Comsat General's SkyBridge and Comsat TeleSystems's TCS-9000 worked—and worked brilliantly—in Mexico City, and that was no accident. It happened because of the dedication of employees like Comsat TeleSystems' Jim Smith and Comsat Laboratories' Ernie Ekelman, the half dozen or so other Comsat people on the scene and hundreds of Comsat support people back in the United States.



"People"—the importance of Comsat people—is the theme of a brief "thank you" letter from NBC's Bobby Lee Lawrence, Director, Network E.J. (Electronic Journalism) Editing, to Comsat TeleSystems' Ed Bender. In his letter, Lawrence is referring to the TeleSystems TCS-9000, but his sentiments could apply equally well to Comsat General's SkyBridge.

"Please pass on our gratitude to your people for their effort above and beyond the call," Lawrence begins. "Everyone was willing, able and dedicated to assisting NBC News in our efforts in covering the earthquake in Mexico City."

Lawrence concludes, "We know the system works and now we know why."



Top floor of this clothing store fell into the floor below. Now the building is useless. *Inset Top*, Tom Brokaw, anchorman of NBC Nightly News, stands in doorway of Comsat General SkyBridge van and listens to a medic recount his version of the search for survivors at Juarez Hospital site. *Inset Bottom*, TeleSystems' Jim Smith, right foreground, with group of newsmen from NBC and other news organizations. In the center, TCS suitcase telephone.



Look how far we've come...

EARTH STATION
IN A
SUITCASE

Pop these suitcases open, do a little set up, and you can talk to almost any location on earth. The TCS-9000 is from Comsat TeleSystems, Inc., the same company that brought the world the light-weight MCS-9100 ship earth station.

In a recent live closed-circuit telecast, brought to an audience in Washington, D.C., via the Intelsat system, Arthur C. Clarke referred to a brief item in the Notes section of the previous issue of this magazine. The audience was assembled in Washington's National Press Club to celebrate the 20th anniversary of uninterrupted international communications service via satellite, and, speaking from Colombo, Sri Lanka, Clarke, the father of the communications satellite concept, was availing himself of the very system that was the embodiment of what he had first proposed in 1945. Asked by a reporter, heard on an audio-only Intelsat-delivered circuit from Europe, what he considered the important new trends in the technology, Clarke opened his copy of the magazine and then pointed to a piece about "an earth station in a suitcase."

For Clarke, probably best known for the science fiction novels *2001* and *2010*, the earth station in a suitcase, a development of Comsat TeleSystems, Inc., is a prime example of an important new trend. It is a trend towards very small, very light, hence very portable, hence very "user friendly" earth stations. It is a trend that means that the benefits of satellite communications now can be directly experienced by almost anyone in almost any location at almost any time on this globe.

The new TeleSystems product is designated the TCS-9000, and is, in fact, housed in two weathertight suitcases and weighs a total of about 100 pounds. The TCS-9000 satellite earth station is designed to work with the global communications system of Inmarsat, and it has received an unqualified type approval from the London-based organization. As an Inmarsat compatible system, the TCS-9000, which uses only 385 watts of power, lets the user connect with the worldwide public switched telephone network. Hence, the TCS-9000 can be used for telex or data traffic as well as for voice. And setup time for the unit is 15 minutes or less even for the average nontechnical operator.

A variety of print and broadcast news organizations covering the brutal Mexican earthquake learned first-hand just how useful the TeleSystems TCS-9000 can be. Two suitcase units purchased by NBC were still in use in the ravaged city over a week after the disaster—one at Channel 13, Mexico City's only surviving television station, one at El Camino Real Hotel. NBC, while making extensive use of the links for its own needs, permitted other broadcasters and newspaper reporters to take advantage of them as well.

To find out more about the TeleSystems TCS-9000 and, in fact, about all that

TeleSystems is doing to make satellite communications equipment lighter, smaller and more flexible, we went to see John M. Pientka, Vice President, Mobile Satellite Systems, at the main offices for Comsat TeleSystems, Inc., in Fairfax, Virginia.

TeleSystems is a part of the Comsat Technology Products (CTP) group. "When you pick up the telephone on the TCS-9000," Pientka told us, "it's like picking up the telephone in your office or in your home. You can make a direct dial call almost anywhere in the world, and almost anyone with a telephone can reach you. That's a very powerful capability to have when you're at an otherwise inaccessible location and getting and receiving information is extremely important to you.

"The terminal is small, and it's lightweight," Pientka continues. "In fact, it's so small and lightweight that it is handcarried in two suitcases. You can transport it as luggage on board a commercial aircraft. You can carry it in the trunk of your car. It will stow on board a helicopter or executive jet or jeep. And once you've reached your destination, you can set it up in 15 minutes or less. The dish is made up of four petals of a graphite and fiberglass composite and once assembled is 35 inches across.

"What you have with the TeleSystems TCS is a connection of long distance quality," Pientka adds. "There is no static as on HF radio, and you don't go through several different stations. Hence, it's a private call. It's not broadcast, and so your conversations are not heard by anyone who wants to listen in on what you're up to. And a nice benefit with any product that works with the Inmarsat system is that you only pay for communications usage when you're actually using it. When you place a call, then and only then does the meter start to run."

Pientka explains that traditionally with satellite systems "you have to arrange for and hence commit yourself to pay for space segment ahead of time. You pay for it whether you use it or not. With the TCS-9000, you pay for usage in six-second increments—just like with any long distance telephone call. That can be very cost effective."

Meeting the need for communications of news organizations seeking service in remote or devastated areas is expected to be just one of several uses for the TeleSystems TCS-9000. Governmental and private agencies performing fire-fighting and other types of emergency services, search and rescue, police work, and management of large tracts

Facing Page, Two suitcases house the complete TCS-9000 earth station in a suitcase. Below, John M. Pientka is Comsat TeleSystems' Vice President, Mobile Satellite Systems. Comsat TeleSystems, Inc., is located in Fairfax, Virginia.



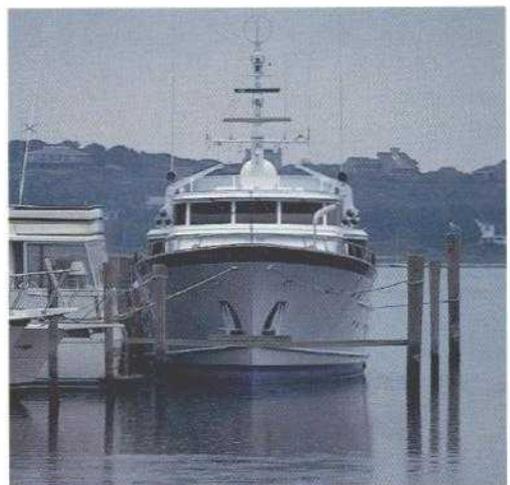
Photography by William J. Megna,
Chief Photographer, Comsat Magazine.



Above, In minutes, TeleSystems TCS-9000 earth station in suitcase can be set up anywhere, including airport tarmac, and user can be connected to worldwide telephone network.

Right, TCS-9000 is outgrowth of TeleSystems' very successful effort to substantially reduce size and weight of ship earth stations, as exemplified by its MCS-9100. MCS-9100 has found a strong market among yacht owners.

Recently system was installed on the yacht East Wind, 91-foot Burger Boat, here shown at Montauk, Long Island, Yacht Club. Facing Page, Bottom, Captain Joel Chunn, skipper of yacht East Wind, using MCS-9100 telephone from bridge.



also should be customers. "For example, we think we'll sell a lot to telephone companies and electric utilities," Pientka states. "When lines are down due to a storm, emergency service people need alternate communications so that they can get into the public network. Say we have an ice storm in Virginia, and they need to reach a sister company in Pennsylvania to request the immediate delivery of replacement cable."

Pientka also sees a big market among the government agencies and business organizations operating in third world countries. Lacking the kind of terrestrial networks that are commonplace in the developed world, the peoples of these nations will find the TCS-9000 a quick way of gaining access to the international public switched network.

And there is still another important market, says Pientka, and that is the worldwide oil exploration and oil production industry. One customer, specializing in well-logging, equips its technicians with a TeleSystems TCS-9000 satellite earth station. Using the unit, the technicians instantly transmit, via the Inmarsat system, their data to a centralized computer facility where it is processed and then analyzed by specialists. If in the opinion of the experts the well is unproductive, say in an oil exploration situation, the oil rig staff can be told about it immediately. No more wasted days of extremely expensive downtime while a well-logging tape is sent by airplane to the experts.

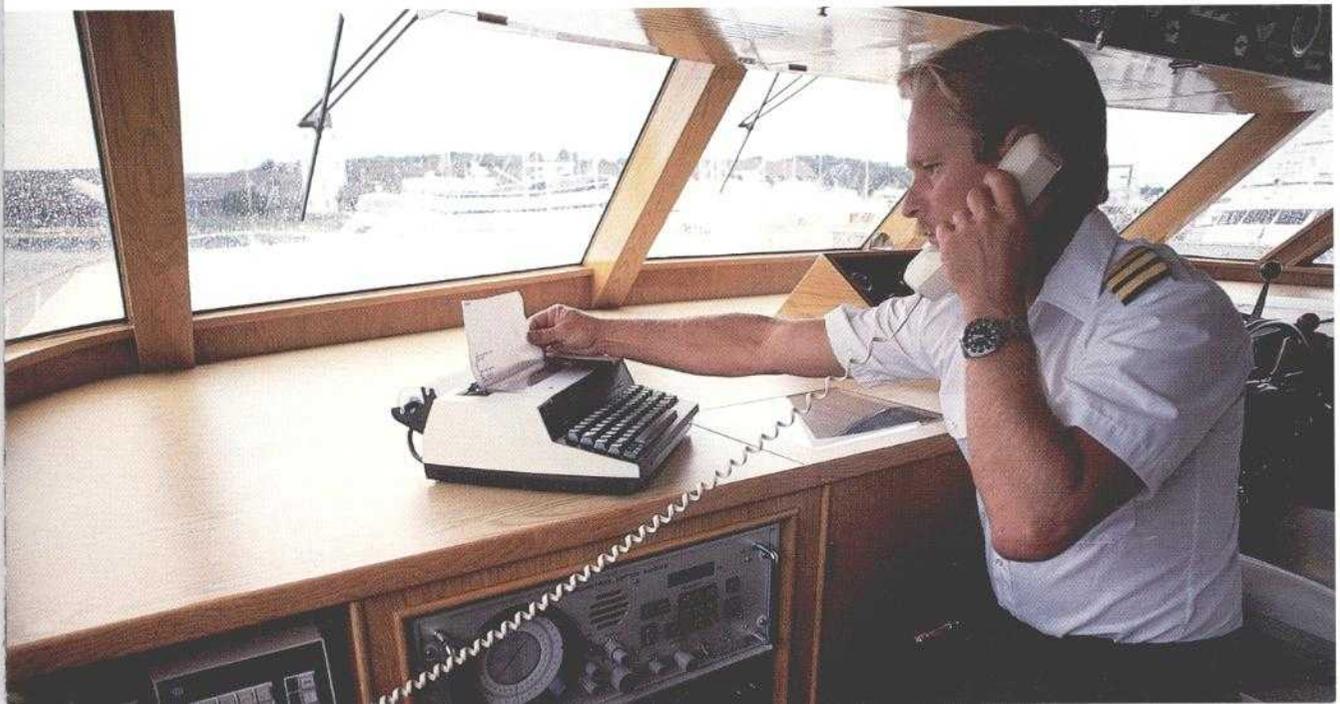
The TeleSystems TCS-9000 satellite earth station, Pientka says, grew out of developmental work on TeleSystems' newest generation maritime satellite earth station, the MCS-9100. Known for its light weight and small, compact profile, the MCS-9100 produced quite a stir in the maritime community when it was first introduced about a year and a half ago. For the first time, satellite communications was available to vessels as small as 50 feet.

(See the article about the sea trials of the MCS-9100 in Comsat Magazine No. 15, page 37ff.)

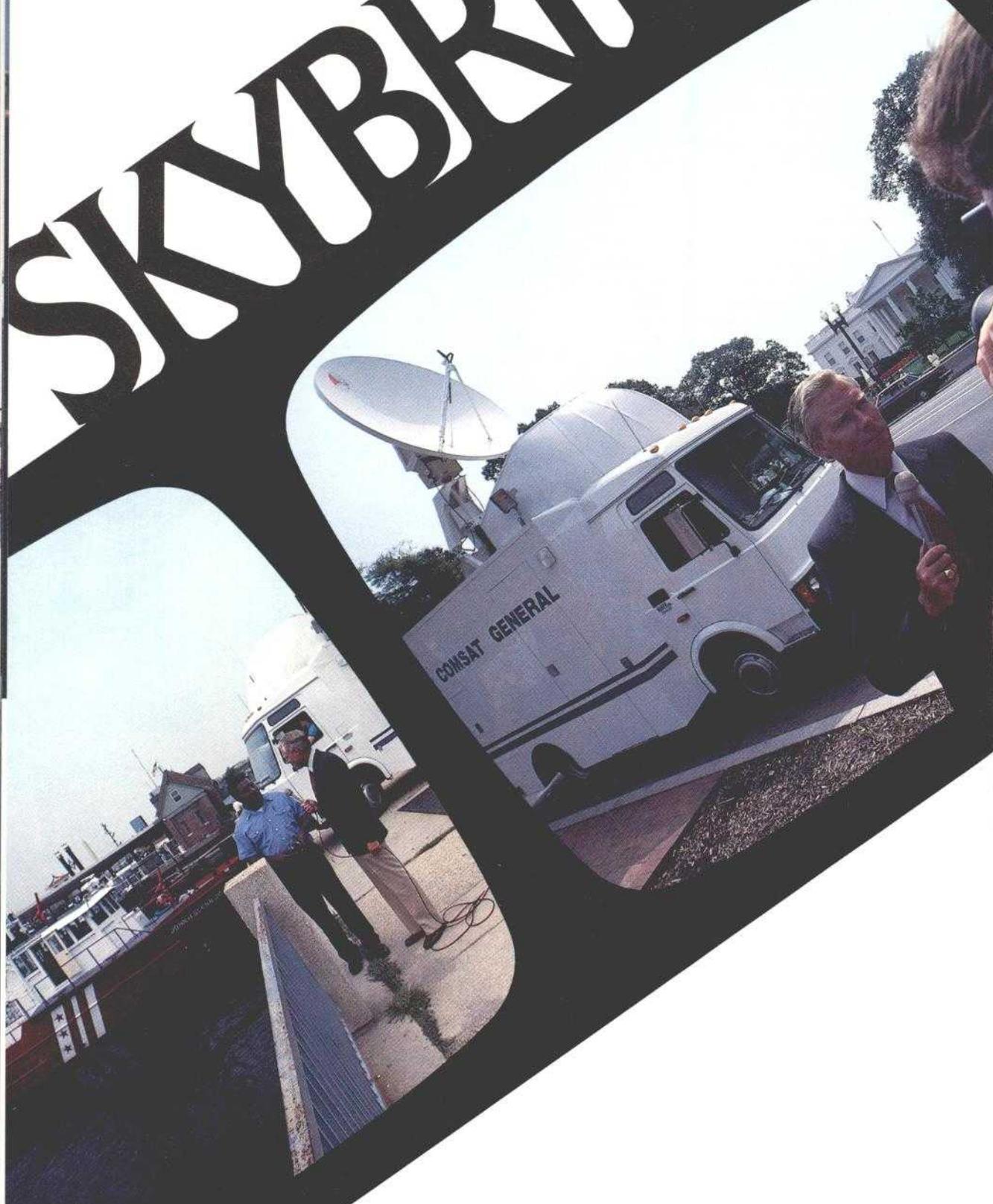
"What we're doing," Pientka explains, "is working with a core technology and applying it to as many products as we can. The goal of this effort is to bring the benefits of satellite communications to as many people as possible through products that are easier to install and use and are less expensive, while remaining highly reliable."

"The MCS-9100 is an extremely good example of how this goal is being met," Pientka continues. "The light weight and the smaller size of the earth station opened up two categories of vessels—yachts and fishing boats—a market that just was not available before. And the MCS-9100 has some other advantages that may not be readily apparent. Because of its reduced weight, it is cheaper to ship to the customer and cheaper to install than the older generation of ship earth stations. The unit simply can be carried on board a vessel by one or two people. You don't need big cranes and heavy lift helicopters to carry out an installation."

Does the advent of systems like the TeleSystems MCS-9100 and the TeleSystems TCS-9000 mean that the two-way wrist radio of cartoon character Dick Tracy is just around the corner? John Pientka answers "yes." "What the user communities are telling us and what economic considerations and the regulatory situation are pushing us toward are smaller and smaller and lighter and lighter equipment," he says. "A commercial wrist radio usable for two-way communications with anyone anywhere in the world is a lot closer than the average person suspects."



SKYBRIDGE

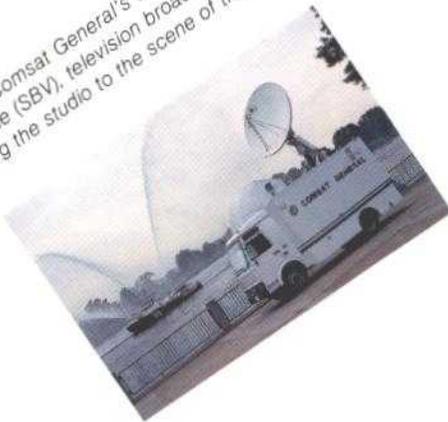


Brings the story back alive

Comsat General's new satellite broadcast vehicle gives new meaning to the expression "live from the scene" for the television broadcaster. If there's a road nearby — or the semblance of one — SkyBridge takes the viewer to the story.



Using Comsat General's SkyBridge satellite broadcast vehicle (SBV), television broadcaster in effect is able to bring the studio to the scene of the action.



It began on a casual note during the 1984 National Association of Broadcasters' convention in Las Vegas. Speaking from Las Vegas via satellite, a news director for the NBC affiliate in Minneapolis asked Comsat's Robert Kinzie in Washington whether the Company could provide his station with a transportable Ku-Band uplink to provide live news feeds from the field to the studio on a regular basis. "Turn around and meet our sales representatives," Kinzie, who is President of Comsat's Communications Services Division, said. "They'll get you one."

On that day, Comsat General began development of its latest service to the video distribution industry. Today, after over a year of intense research and development, the Company is offering a new mobile uplink service, providing broadcasters and other video distribution businesses a sophisticated, state-of-the-art tool designed to allow live, remote video feeds from anywhere in the country to television studios or other video production facilities.

Comsat General's new satellite broadcast vehicle (SBV) is not the company's first endeavor in providing the broadcast industry with flexible and mobile satellite services. Already, the Company operates six 18-wheelers as a major component of its contract with the NBC television network. The trucks traverse the country on a weekly basis, providing NBC with uplinking facilities for major sports, news, and other live events.

But Comsat General's latest version, called SkyBridge, meets a different need. In the highly competitive broadcasting industry, where being first means more revenues, news executives are looking for ways to reduce the time to report fast-breaking events. Aggressive broadcasters are in an industry where pictures really do mean more than words. "Live at the scene" has become an increasingly powerful catchphrase in the race for ratings supremacy.

Only a few short years ago, the primary tools for remote feeds were sophisticated "electronic news-gathering" (ENG) vans, equipped with microwave transmission capabilities. Then, broadcasters began using helicopters in the race to report a major event.

These mobile services are still in wide use today. But increasingly broadcasters are finding that events affecting the lives of their viewers are not necessarily confined to the geographic areas which can be served by helicopters or ENG vans. What happens when

by Art Hill, Manager,
Commercial Sales,
Comsat General Corporation.
Photography by William J. Megna,
Chief Photographer, Comsat Magazine.



the local football team goes to the Superbowl? How can the local news cover a remote forest fire which threatens the homes of its viewers? If the U.S. Congress or the state legislature is debating an issue of major concern, how can news directors relay a live report from Washington or the statehouse to viewers on the late-night news?

As their desire to cover even more distant events increased, broadcasters began looking to satellite communications to bridge the gap. Even then, the expense of such coverage or terrestrial interference for older generations of satellites posed a major barrier.

Advancing technology provided the answer to more widespread use of satellites. Ku-Band satellites, first developed by **Comsat**, allowed users to bypass local interference barriers. Smaller earth stations could also be used with the more powerful spacecraft, which reduced costs and made possible the use of smaller mobile units.

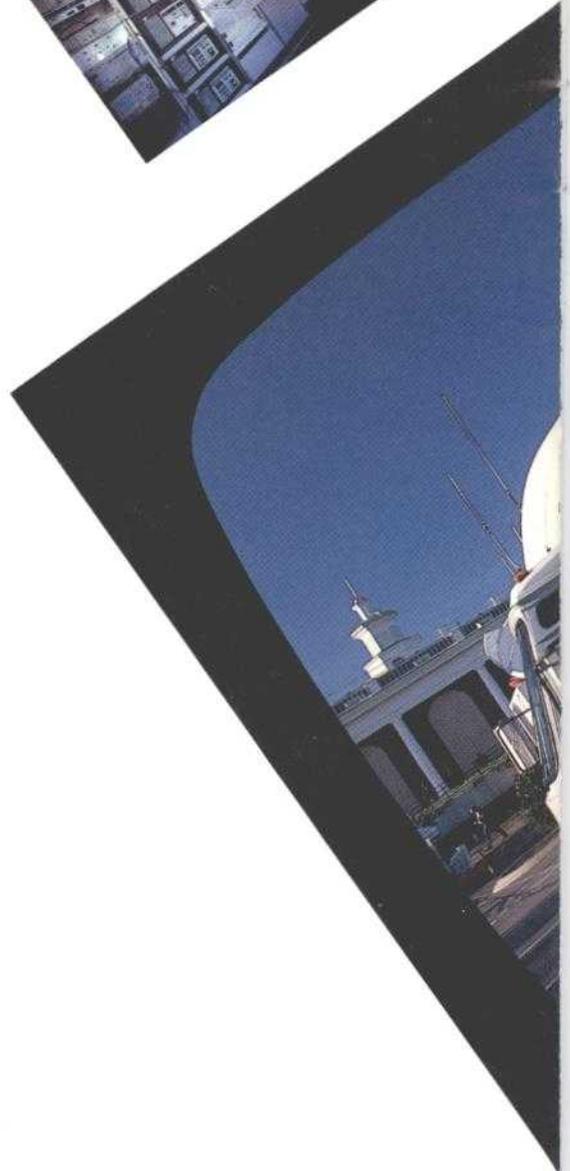
Today, most broadcasters believe Ku-Band systems are an ideal way to provide live feeds from the field to the studio, particularly from distances which until now could not be reached by conventional mobile services. Increasingly, Ku-Band transponders are being used to "backhaul" live or taped feeds to studios for editing or immediate transmission to television viewers.

The heart of **Comsat General's** transportable uplink service is the van itself. Jim Delany, Manager, Antenna Engineering, project manager for the development of the van and a 25-year veteran in the design of satellite hardware, initiated an exhaustive design review of transportable satellite equipment. "We were not satisfied with products already on the market," Delany recalls. "Our goal was to build from the wheels up as stable a platform for the uplink as possible, using a relatively small, custom-designed vehicle capable of transmitting a signal to the studio within fifteen minutes of its arrival at a site."

Based on his study, as well as numerous conversations with broadcasters, Delany and his staff, which included Engineer Peter Crump, designed a sturdy, double-axled vehicle, measuring 19 feet long, 8 feet wide, and 10 feet high. SkyBridge is equipped with a unique motorized 2.4 meter diameter antenna designed by **Comsat General** and Radiation Systems, Inc. The operator can raise and lower the antenna mechanically from inside the vehicle. Because of its unique roof mount, the antenna provides 355 degrees of azimuth and 90 degrees of elevation coverage, permitting operation from nearly any orientation.

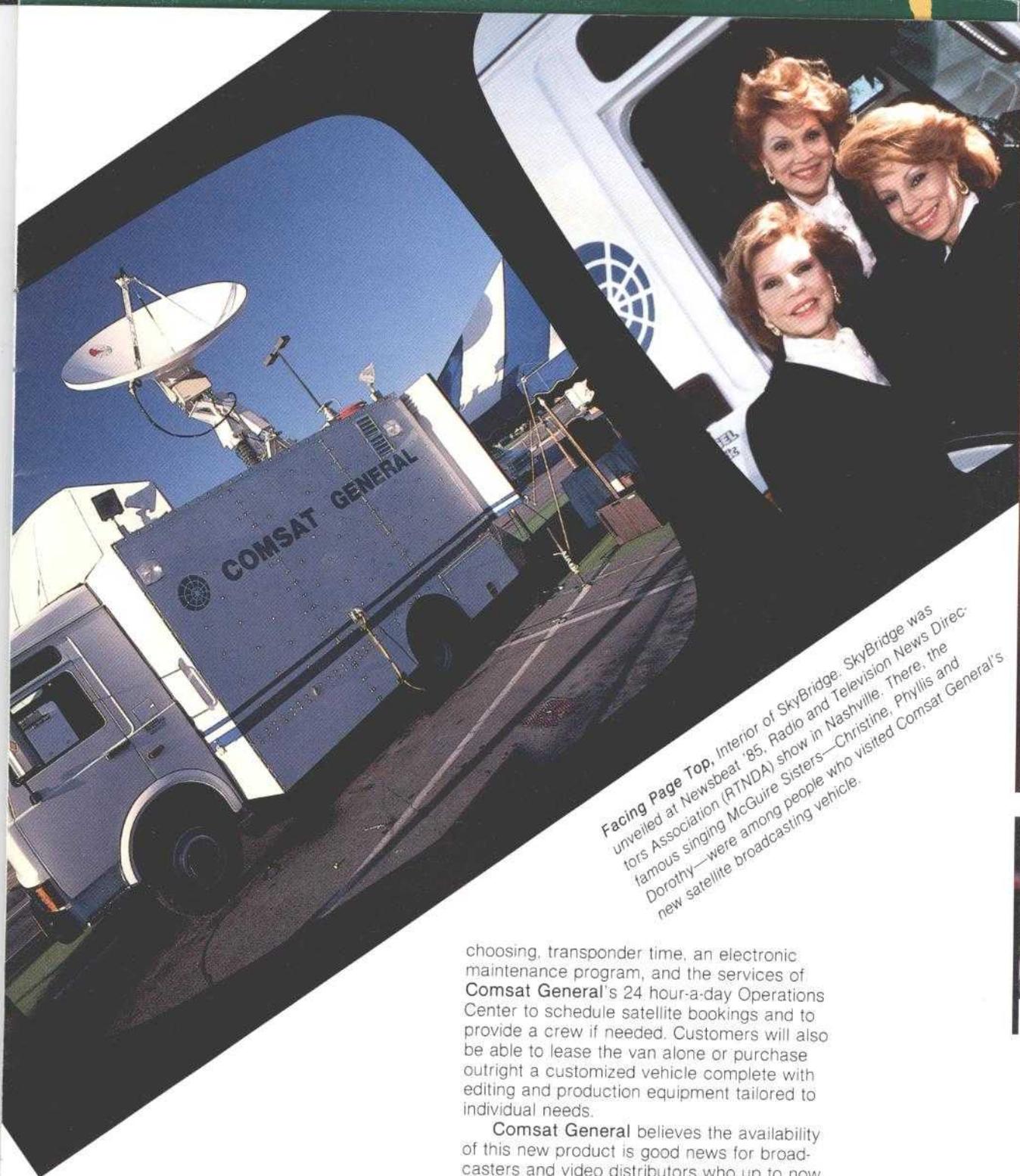
The electronics package for SkyBridge includes two redundant high power amplifiers, a video receiver for monitoring, and professional video and audio test equipment. All equipment is mounted on easily accessible racks, with ample room for installation of editing and production equipment as required. Two 6.5 kilowatt generators provide sufficient power to support the electronics package as well as the on-board air conditioner.

Other standard features include motorized jacks on each corner for stability, an optional



microwave line-of-sight transmission system using a pneumatically-operated elevating mast and antenna for use by the mobile unit's camera crew, and an alarm system designed to alert the operator of operating malfunctions and to provide automatic High Power Amplifier (HPA) switchover.

Also included as part of the standard package are an external lighting system for nighttime feeds, and a vehicle security system. The on-board communications system features telephone jacks, a cellular radio unit, and a unique audio system to provide two-way voice communications via satellite between SkyBridge and the studio as well as **Comsat**



Facing Page Top, Interior of SkyBridge. SkyBridge was unveiled at Newsbeat '85, Radio and Television News Directors Association (RTNDA) show in Nashville. There, the famous singing McGuire Sisters—Christine, Phyllis and Dorothy—were among people who visited Comsat General's new satellite broadcasting vehicle.

General's Operations Center.

While this equipment package is configured to meet the needs of video broadcasters, SkyBridge has been designed to accommodate other communications needs. Thus, Comsat General could refit a truck for video or data purposes to suit the needs of individual customers.

Comsat General's flexible marketing plan provides its customers with a variety of ways to obtain the SkyBridge service. As a leased network service, for a fixed monthly rate, the company will provide one or more vans, a downlink located at a site of the customer's

choosing, transponder time, an electronic maintenance program, and the services of Comsat General's 24 hour-a-day Operations Center to schedule satellite bookings and to provide a crew if needed. Customers will also be able to lease the van alone or purchase outright a customized vehicle complete with editing and production equipment tailored to individual needs.

Comsat General believes the availability of this new product is good news for broadcasters and video distributors who up to now have had very little control over transmission systems and their costs. With the Comsat General mobile uplink service, users will have within their control a reliable, flexible, and tested backhaul system to provide nearly instantaneous coverage from the field, regardless of location. With its long-term, fixed price leasing package, the Company's new service will bring cost stability to a market plagued in recent years by the rising and unpredictable costs of competing distribution technologies.

The road to live coverage of events outside the studio has been a rocky one. But with Comsat General's new SkyBridge satellite broadcast vehicle, users are now in the fast lane.



If you could remove corridor wall at hotel or motel that subscribes to HI-NET Communications service, this is what you'd find—guests enjoying HI-NET's exciting television programming. Hotel rooms without corridor walls are exactly what one does find at Holiday Inns model showroom in Memphis.

HI-NET

The nation's newest and largest television entertainment network—HI-NET, dedicated to meeting the entertainment needs of the lodging industry—started transmitting programming on September 12. The event was marked at the studio and uplink facility of HI-NET Communications in Memphis, Tennessee, with a traditional ribbon-cutting ceremony with an untraditional twist. Several at very distant locations participated in the ceremony by means of satellite links.

The ribbon was cut, and a handful of hotels in Indiana and Pennsylvania received the first hours of transmission of HI-NET's four continuous channels. Within the next few months over 1,000 hotels all across the country will receive the service 24 hours a day.

Bill Goforth, President of HI-NET Communications, conducted the ceremonies in

Memphis, assisted by Michael Rose, Chairman and Chief Executive Officer of the Holiday Corporation, and Irving Goldstein, Chairman and Chief Executive Officer of Comsat. Among those people who participated though far from Memphis was Dr. Joseph V. Charyk, former Comsat Chairman and Chief Executive Officer, who spoke from a temporary studio set up for the purpose in the Okura Hotel in Tokyo, Japan. Dr. Jerry Whalen, President of GTE Spacenet, the providers of HI-NET's space segment, participated from almost as great a distance. Dr. Whalen was seen at the Launch Control Center in Kourou, French Guiana, where he was attending a launch of the Ariane rocket containing a GTE Spacenet satellite in its two-satellite cargo bay.



Meeting the Entertainment Needs of the Lodging Industry.

Also taking part via satellite were Governor Lamar Alexander of Tennessee who spoke through a television link via satellite from the Governor's mansion in Nashville and Dr. Richard Leshner, President of the U.S. Chamber of Commerce, who appeared before the cameras in the Comsat General videoconferencing facility in L'Enfant Plaza in Washington, D.C. Each speaker was introduced in turn from Memphis, and each spoke of the importance of the new system. As each speaker finished he remained on camera, and upon a "launch countdown" from Memphis, all participants simultaneously cut a multicolored ribbon to officially open the new entertainment service to the hotel industry.

The event marked the successful culmination of the first phase of a unique marriage between two diverse companies—HI-NET

Communications, Inc., wholly owned by the Holiday Corporation, and Comsat General Corporation. The partnership, the world's largest privately owned satellite system, offers in-room entertainment and videoconferencing throughout the United States. Since January, the partnership has consummated contracts totalling over \$100 million to build the new system. These contracts cover provision of the technically advanced broadcast facility in Memphis; satellite antennas, receiving equipment and sophisticated computer equip-

by **Frederick L. Hofmann**,
Executive Vice President, HI-NET Communications.
Photography by **William J. Megna**,
Chief Photographer, Comsat Magazine.

HI-NET Communications antenna for Holiday Corporation's Crown Plaza Hotel in Memphis, Tennessee.



ment to be installed in all participating hotels; first-rate entertainment programming; and satellite transponders to link the elements of the system together.

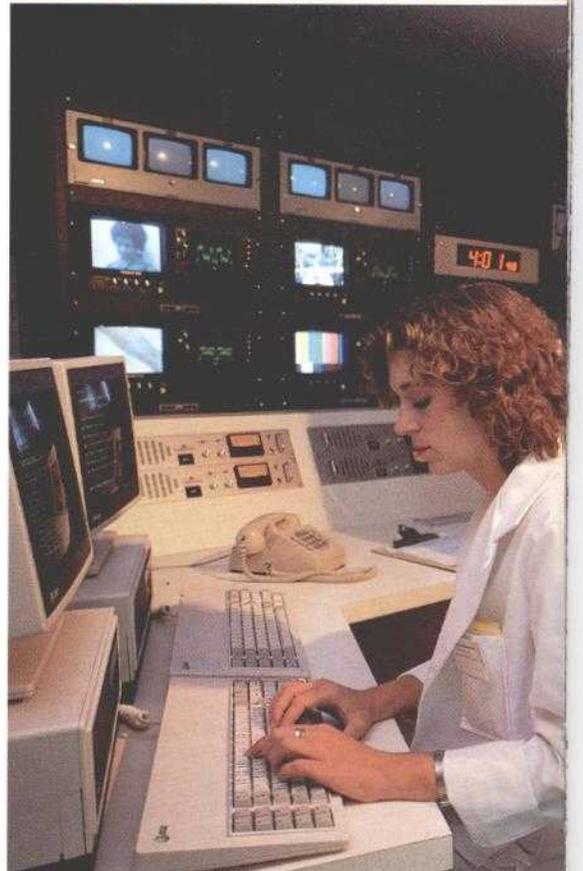
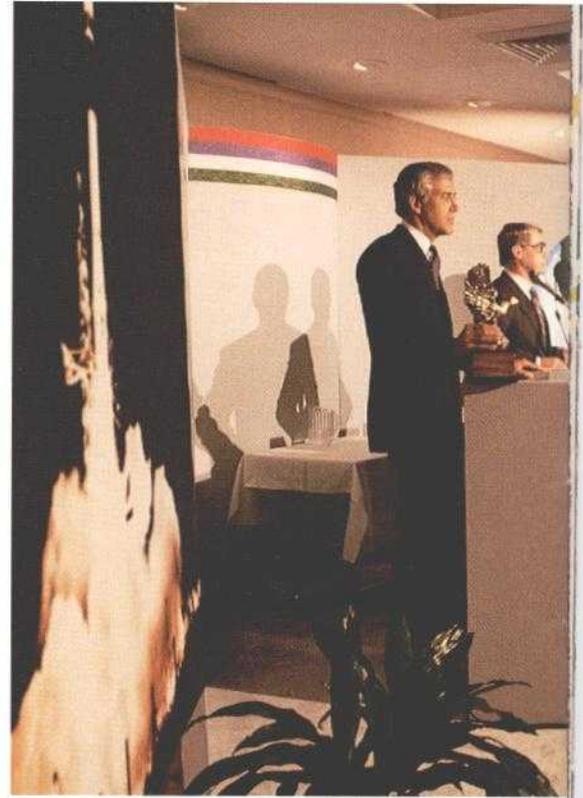
The network architecture calls for providing four video channels to each hotel. Three are offered to the guest free of charge: the Showtime Channel, a leading cablemovie channel offering premium movies and special programming; the Entertainment of Sports Programming Network (ESPN), providing 24-hour, seven-day-a-week sporting events and business news, and Cable News Network (CNN) Headline News, which offers national and international news around the clock. A fourth channel, Satellite Cinema, is a HI-NET exclusive, consisting of recently issued family entertainment and late night adult fare, which will be offered to the guest on a pay-per-view basis. Special events will also be shown from time to time on this channel. The hotel guest will select his choice of channels from a small box mounted atop the television set in his room.

Designed to be as easy for the guest to use as is possible, the simplicity of the set-top unit belies the complexity of the network that delivers the program to the hotel room. The heart of this system is the major new studio and uplink facility in Memphis, where five large satellite antennas work 24 hours per day. The same Harris Corporation team that built the NBC-TV network distribution system for **Comsat General**, designed and installed the Memphis transmission system to HI-NET Communications specifications.

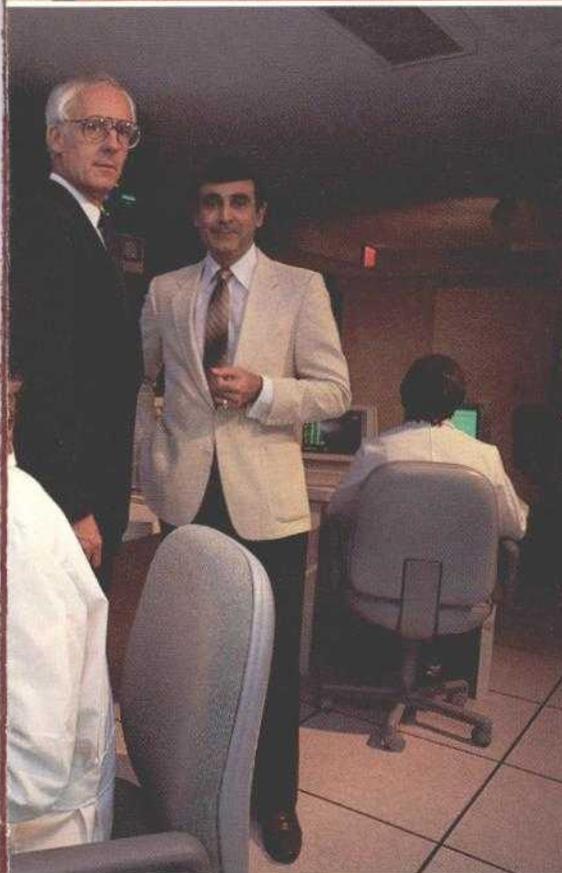
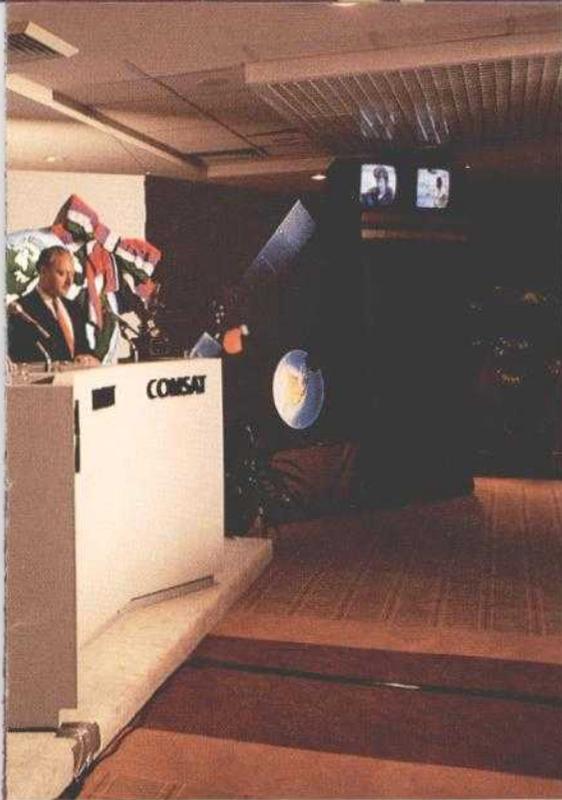
Two 8-meter C-Band dishes are pointed at the Satcom III R and Galaxy I satellites from which they receive a steady stream of signals representing CNN Headline News, ESPN, and Showtime East and West (two channels, separated by time zones, so that programs intended for the Western half of the U.S. are broadcast later than for the Eastern half). These signals are routed into the Master Control Room of the Broadcast Operations Facility. There, the Satellite Cinema premium pay-per-view programming originates on video tape playback machines, again in two channels for two time zones, and all the signals are routed through complex switching equipment designed, built and installed by Bluff City Electronics of Memphis. Six separate sets of signals are routed to two 6-meter Ku-Band antennas for transmission to the GTE GSTAR I satellite and then to the participating hotels.

One of the major reasons for choosing Ku-Band transmission for the new service is its ability to provide quality signals in highly populated areas where C-Band programs are often drowned out by electronic interference. An innovation designed into the transmission system is the combining of the signals so that two channels of video are carried side-by-side on each transponder. Thus only three transponders are required to broadcast all six channels, at a tremendous savings in cost.

Each hotel receives the video signals through a 4.5 meter satellite antenna, designed, built and installed by Scientific Atlanta. The signals enter the hotel and are separated



into four channels which are distributed throughout the hotel to the guest rooms. There, they enter the Scientific Atlanta set-top unit and await the guests' choice of channel selection. Should the guest wish to view the pay-per-view channel, another unique feature of the HI-NET system comes into play. Pressing the Satellite Cinema button signals an AT&T minicomputer, located near the hotel front desk, and the computer automatically sends a preview of the entertainment and a



notice to the guest that he must press the button a second time in order to view the full feature and that the room will be billed for the show. If the guest does wish to see the feature, the computer automatically prints a bill at the hotel front desk.

Designed to be simple for both the guest and the hotel operators, the service has a number of other features which are extremely valuable and time-saving. Each time a guest

Top, Ribbon cutting ceremony inaugurating nationwide television service was conducted at studio and uplink facility in Memphis of HI-NET Communications by, from left, Michael Rose, Chairman and Chief Executive Officer of Holiday Corporation, Bill Goforth, President of HI-NET Communications, and Irving Goldstein, Chairman and Chief Executive Officer of Comsat. Bottom, In HI-NET main control room HI-NET's Fred Del Toro, Senior Vice President, with author Hofmann and Christine Oths, foreground.

views a pay-per-view movie, a record is made in the hotel computer. Once each month, in the middle of the night, a large computer in Memphis comes to life and automatically dials each hotel with HI-NET service and reads out the stored information in the hotel computer. Thanks to the system, HI-NET is able to bill the hotels for the actual movies watched, and it also permits statistical analysis of the viewers preferences by movie title and by viewing time of day.

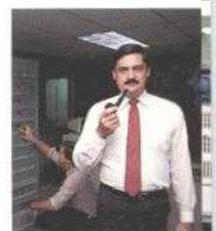
Other computers located in Memphis and at the Comsat General Satellite Control Center in Washington permit remote diagnosis of problems at hotels. If a hotel manager has a technical problem he can call a trouble number in Memphis or Washington, 24 hours a day, and ask for help. The duty operator will connect the diagnostic computer to the hotel computer, via telephone lines, and proceed to probe for the source of the difficulty. Should the problem be caused by a procedural error, the duty operator can, in most cases, recycle the recalcitrant machine and solve the problem.

HI-NET Communications is the largest provider of ad-hoc videoconferences in the world. The new network will provide vastly expanded opportunities for videoconferences in more locations on shorter notice than ever possible before. Commands from the Memphis Uplink Facility will permit only participating hotels to receive videoconferencing signals and will block out all other hotels.

Early in 1986, an encryption system will be added to the network to protect against the unauthorized reception of programming by non-subscribers. All channels will be encrypted at Memphis, and each hotel will be provided with decoding units. In addition to providing security for entertainment programming, this will provide automatic security for all videoconferences. Scientific Atlanta will build and install B-MAC encryption equipment, developed jointly by Comsat's Satellite Television Corporation and Scientific Atlanta.

At the present rate of installation, 1,000 hotels will be HI-NET customers by early next year, and plans are already being made to add capabilities to the network. Data transmission and voice, both requiring the addition of transmission capability at the hotel, are being studied. Further in the future is the possibility of making available interactive databases for the guest, thus bringing a whole range of new services directly to the individual hotel room.

Roger Pience is HI-NET's Vice President, Engineering Development.



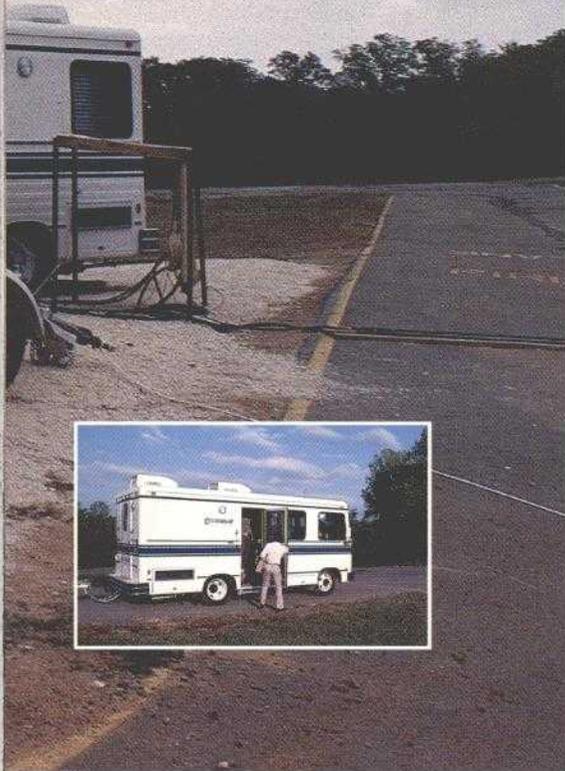
STARC



Above, Temporary hub for Starcom system installed at the Halliburton Company's facility in Arlington, Texas. Temporary hub will be replaced by permanent installation, and van—note closeup in Inset, right—and parabolic dish antenna will travel to facilities of other customers and prospects to demonstrate capabilities of system. Left, Comsat Technology Products executives inspect very small aperture terminal (VSAT) for Starcom system, from left, Charles A. Zito, Vice President and General Manager, Network Products; Charles E. Reutter, Marketing Director, and A. William Perigard, President.

*Photography by William J. Megna,
Chief Photographer, Comsat Magazine.*

OM



Private networks dream come true.

With Starcom, IBM computers communicate interactively in a protocol environment with excellent response times. From Comsat Technology Products' Network Products Division, the system is the heart of a nationwide network that American Satellite is installing for Halliburton.

For years, business fortune-tellers have predicted that American corporations would turn to private satellite networks for their communications needs, especially data transfer, electronic mail and voice transmissions. A recent announcement by Comsat Technology Products, Inc. (CTP), a wholly owned subsidiary of Comsat, gives cause for a lot of optimism that the prediction is finally coming true.

What CTP has announced is that its Network Products Division has been selected to supply interactive data communications terminals to the American Satellite Company of Rockville, Maryland, for use in a nationwide, high-speed data network being designed by American Satellite for the Halliburton Company of Dallas, Texas.

The agreement marks the first major contract award for CTP's recently introduced satellite system, called Starcom, a system especially noteworthy for its ability to make available four services within a widely dispersed network: interactive data, electronic mail, high-speed facsimile transmission, and "thin-route" voice.

The contract calls for the delivery of a central hub station and more than 120 remote transmit and receive terminals, which will be located throughout the country. They will provide the ground segment for the high-speed data network that American Satellite will design and manage for Halliburton. The American Satellite network will initially be used by Halliburton to transmit data in support of its oil field services operations. It will operate in the Ku-Band frequency with CTP-manufactured small aperture (1.8 meter) earth stations. Voice and transportable earth station services will be made available to American Satellite based on Halliburton's operational requirements.

Three developments are the reasons for the newfound optimism that satellites and private network organizational communications—such as business communications—belong together: VSAT, protocol compatibility, and divestiture.

VSAT stands for very small aperture terminal. It is a rugged and highly reliable VSAT that is the heart of CTP's Starcom Satellite Communications System. These terminals have dish antennas of 1.2 and 1.8 meters (four feet and six feet in diameter) respectively.

The Starcom VSAT is a remote receiving and transmitting terminal that is combined with numerous other Starcom terminals to form a communications network. At the core of the system is the Network Control Center or hub, which houses the network control computer. The computer acts as a high-tech traffic cop, directing bits of information from one terminal to another and controlling the flow of communications.

The small size of the VSAT makes it ideal for business customers to use as an On-Premise Terminal (OPT). Smaller terminals are practical, easy to install and affordable, as the price of Ku-band equipment begins to reflect the economies of scale inherent in mass production. By installing a Starcom VSAT at branch offices, retail outlets, key factories or other locations, a business can have instan-

In charge of data communications at Halliburton Company is Thomas M. Woods, Director of Information Services.



Starcom very small aperture terminal (VSAT) at Otis Engineering Corporation headquarters building in Carrollton, Texas. Otis is a wholly owned subsidiary of Halliburton Company. Derrick structure, top rear, is part of Otis oil well used for test purposes.



taneous access to essential information through its own private "star network."

An added benefit is a rugged, portable version of the Starcom VSAT that can be taken apart and reassembled in a matter of hours.

"You can put it in the back of a jeep and take it to any remote location," says Charles E. (Chick) Reutter, CTP Marketing Director.

Network Products is producing the Starcom system as part of a team effort with Mitsubishi Electric Corporation (Melco). Melco, a world leader in the manufacture of radio frequency (RF) equipment, is responsible for the microwave electronics that are an essential part of the VSAT.

The Starcom system has some basic technological advantages over a traditional telephone landline network. These advantages give clients performance enhancements and significant cost reduction.

"The VSAT communicates data to the Hub at 56 kilobits per second and receives data from the Hub as individually addressed packets of data running at 256 kilobits per second," explains Reutter. "Moving data at those rates makes computer networks operate much more efficiently."

For example, current landline customers leasing from AT&T typically receive data with a five- to seven-second response time (the time it takes for data to be transmitted to and from the host computer). For the sake of comparison, say that the price for the leased lines for such a service could be in the neighborhood of a million dollars a year, not including the cost of leasing the modems that allow data transmission.

"Our network would give the same customer screen-fill to screen-fill in 1.5 to 3 seconds," says Reutter. "And it would cost a one-time charge of about \$1.5 million. With the elimination of the cost of leasing modems equalling the annual satellite charges, the customer gets a fast payout and then saves a million dollars a year."

But without the second development—protocol compatibility—the Starcom system would be just another great idea that never got off the ground. Until recently, there was always a missing link in developing satellite communications networks for the transfer of data. Although computers could perform a vast array of impressive tricks, they could not readily communicate with each other via satellite.

"Computers talk to each other the same way people do," says Reutter. "There is a protocol involved. If I start a sentence and you have a question, you defer your question until I finish. There is the same hierarchy of protocols in the way computers talk to each other."

In a private network, the host computer at the Hub transmits information to other computers linked to the VSATs that have been installed at various locations. In order to communicate, the host computer polls each remote computer and asks if it has any information to impart.

"The host computer goes around to every terminal in the network asking this question," Reutter explains. "If it fails to get an answer within a preset interval it determines that the terminal in question has malfunctioned and writes it out of the network."

Unfortunately, this interval is frequently not long enough for the terminal to respond and computer-to-computer data delivery via satellite traditionally has been regarded as difficult, if not impossible.

"Until now, many people were saying that you could not operate interactive networks efficiently over satellite," says Reutter.

Apparently, they overlooked the ingenuity and resourcefulness of the people at CTP's Network Products and Comsat Laboratories.

"We worked out a means of dealing with the computer protocols," says Reutter. This software method enables the computers to talk to each other despite the intervals window. "It gives us a powerful edge," Reutter states.

The last of the three developments that created the marketplace for private satellite networks for data, electronic mail and voice communications is the now-historic break-up of AT&T. With the divestiture of the telephone company, businesses are more apt to explore alternatives to traditional landline communications. Many are looking for networks that offer better performance, lower cost, more direct control, and a data security system to protect the confidentiality of their information. The Starcom product line delivers exactly what these business customers desire.

With the Starcom VSAT, data transfer is enhanced by the 56 kbps transmission rate. Other benefits accrue for customers in need of electronic mail and voice communication services.

For Charles A. Zito, Vice President and General Manager, Network Products, and for A. William Perigard, President, CTP, CTP's Starcom is the reason that the long-sought objective of creating private satellite networks for business is now finally a reality. Says Zito, "The Starcom product took literally years of effort on the part of Comsat Laboratories in technology and networking techniques. We're unique in having that resource here. To make two IBM computers communicate interactively with each other in a protocol environment via VSAT with excellent response times is a complex task. A lot of people have talked about it, but we have made it work."

Says CTP President Perigard, "Our ability to implement this network in the fourth quarter of this year with both hardware and software in an IBM environment makes us a leader in this field. This system provides a solid example of the innovative products we're developing to meet customers' communications requirements. These earth stations are small, easily installed, and offer a faster transmission speed than is available over landlines to most cities—capabilities with great appeal to any business with geographically dispersed locations that is seeking to reduce the cost of communicating."

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liaison with U.S. international service carriers and information on BTI's range of services to U.S. customers.

State Dept. leases half circuits from Comsat International

Comsat International Communications, Inc. (CICI), has been selected by the State Department to provide satellite communications services from Washington, D.C., to the United States Embassy in London and the United States Mission in Geneva.

Comsat International is leasing to the State Department two half circuits of 1.544 megabits per second that it will use for voice, data, facsimile and videoconferencing services. Comsat International will provide this capability via its new international earth station that will be located at its headquarters in Washington.

JISO extends contract two years for television service

Comsat International Communications, Inc., has been awarded a two year contract extension—April 1, 1986 to March 31, 1988—from the Japanese International Satellite Joint Users Organization (JISO) for 24 hour-a-day international television service. Comsat will receive approximately \$787,000 annually, based on its recently modified tariffs. Original service began in April 1984.

The service is transmitted via the Comsat International Standard B earth station in Santa Paula, California, to a Pacific Ocean region Intelsat communications satellite. The signal is received by the KDD Standard A earth station in Ibaraki, Japan.

JISO consists of NHK (Japan Broadcasting Corporation); Nippon Television Network Corporation; Tokyo Broadcasting System, Inc.; Fuji Television Network, Inc.; Asahi National Broadcasting Co., Ltd.; and Television Tokyo Channel 12, Ltd.

Comsat International is currently providing nine full-period international television services to locations in the Atlantic and Pacific Ocean regions.

American Law Network is offering continuing education

The American Law Network, a satellite network designed and installed by Comsat General Corporation, has been inaugurated. The system will be used primarily to broadcast continuing legal education programs throughout the United States.

Comsat General will operate and maintain the Ku-Band network, which consists of an uplink in Washington, D.C., satellite transponder time, and downlink earth stations at law-related and educational facilities nationwide.

The American Law Network is a joint venture between Comsat General and the American Law Institute-American Bar Association (ALI-ABA) Committee on Continuing Professional Education. Initially, the system will distribute programming to 37 sites throughout the country. By late 1985, Comsat General expects to install 13 additional sites, with more planned for 1986 and the following years. ALI-ABA will provide and manage the programming and will market the programs to the legal community.

"Comsat General is pleased that the first stage of the American Law Network is ready for operation. This is just one example of how video distribution through satellite technology can be used for continuing education and training," said Comsat General President William Mayo.

Gallium Arsenide transistor breakthrough is made known

Comsat Laboratories has announced a breakthrough in the technology of millimeter wave Gallium Arsenide (GaAs) power field effect transistor (FET) development. The Laboratories has successfully fabricated GaAs FETs having state-of-the-art performance at 20 gigahertz (GHz) with one-watt output power, a 29 percent power added efficiency at the one dB gain compression point and a 4.5 dB small signal gain.

Continued next page

Dr. John L. McLucas, most recently Executive Vice President and Chief Strategic Officer, has retired.



These characteristics should be compared with commercially available 20 GHz one-watt FETs having an efficiency of only about 15 percent.

"This achievement," according to Dr. John Evans, Director of the Laboratories, "marks a major step in improving the characteristics of solid state power amplifiers, especially for satellite applications."

John L. McLucas, aviation and space expert, has retired

Having reached the Corporation's mandatory retirement age, Dr. John L. McLucas, most recently Comsat's Executive Vice President and Chief Strategic Officer, has retired. Dr. McLucas's career with Comsat capped a distinguished record in both government and business, and he continues to be widely regarded as an authority in the fields of aviation and the uses of outer space.

Dr. McLucas joined the Corporation in 1977 as President of Comsat General Corporation. In 1979, he was named President of Comsat World Systems Division, which at the time consisted of the Corporation's two jurisdictionally mandated activities, its biggest business.

From 1975 to 1977, he was Administrator of the Federal Aviation Administration. During the previous two and half years, he was Secretary of the Air Force and Under Secretary for the four years before that. From 1966 to 1969, he was President and Chief Executive Officer of the Mitre Corporation and before that was Assistant Secretary General for Scientific Affairs with the North Atlantic Treaty Organization (NATO) in Paris.

Some of Dr. McLucas's responsibilities have been assumed by Richard L. McGraw who joined Comsat in early September as Vice President, Corporate Affairs.

New posts, responsibilities mark changes in officer ranks

Jerome W. Breslow, Secretary of the Corporation since 1979, has been elected to the newly created position of Vice President and Assistant to the Chairman and Chief Executive Officer. In this position, Mr. Breslow will assist Comsat's Chairman and CEO and its President in the conduct and management of the executive office and in their liaison with the Board of Directors.

Assuming the duties of the Secretary of the Corporation is Willard R. Nichols, Vice President and General Counsel since 1984. Mr. Nichols' new title is Vice President, General Counsel and Secretary.

Stephen M.D. Day, Vice President, Corporate Development, since 1983, has been elected Vice President, Marketing and Corporate Development, a position change that "reflects the importance of marketing to Comsat and the expanded role he will play in coordinating, supporting and guiding the major marketing activities of our businesses," according to Irving Goldstein, Chairman and Chief Executive Officer. In addition, Mr. Day continues to manage the corporate development function.

Richard L. McGraw, formerly Senior Vice President, Corporate Communications, for Eastern Airlines, is Comsat's Vice President, Corporate Affairs. Mr. McGraw assumes responsibility for the Corporation's government, public and investor relations programs and employee communications and reports to Chairman and CEO Goldstein. Before joining Eastern Airlines in 1983, Mr. McGraw served for four years as Vice President, Public Affairs of Searle Pharmaceutical/Consumer Products Group and Searle Research and Development. Earlier he had been Executive Director and Chief Executive Officer of the Alliance to Save Energy and Deputy Undersecretary for Field Operations of the U.S. Department of Housing and Urban Development.

Gilbert Rye, Director of Space Programs on the National Security Council since 1982, joins Comsat as Vice President of Government Systems, Communications Services Division. In this newly created position, Mr. Rye directs

Comsat's efforts associated with the provision of communications systems and network services to the Department of Defense and other Government agencies.

Don W. Flora, formerly Vice President, Sales, of Comsat General Corporation has been named Vice President, Sales and Special Programs, Government Systems, reporting to Mr. Rye.

Elected Vice President and General Manager of the Network Products Division of Comsat Technology Products (CTP) is Charles A. Zito. Mr. Zito served most recently as CTP's Vice President, Marketing and Business Development.

SEL receives TeleSystems license for TDMA equipment

Comsat TeleSystems, Inc., has licensed Standard Elektrik Lorenz, AG (SEL), for the manufacture of Time-Division Multiple-Access (TDMA) equipment in West Germany. Under the terms of the agreement, technology transfer for TeleSystems's DST-1100 TDMA equipment will begin in 1986. Thereafter, SEL may manufacture and market the equipment for specific applications in the international telecommunications marketplace.

TeleSystems' DST-1100 TDMA equipment was initially designed for the West German Telecommunications Satellite (DFS) Network. Through extensive use of state-of-the-art microprocessor components and software techniques, TeleSystems' DST-1100 produces a highly reliable 60-megabits-per-second TDMA system capable of establishing and, if necessary, rapidly changing network circuit interconnection. The DST-1100 optimizes utilization of satellite transponders through "transponder hopping" technology—a feature that increases network bandwidth by connecting users over several transponders. In addition, the equipment's Demand-Assignment Multiple-Access (DAMA) capability allows for automatic, real-time, reconfiguration

to permit the network to adjust rapidly to changing user traffic patterns.

In announcing the agreement, TeleSystems' President, Donald L. Bise, stated, "Licensing SEL to manufacture the DST-1100 represents a milestone in our highly successful TDMA program. The agreement is a further testament to the quality, reliability and economic advantages of TDMA technology and TeleSystems' DST-1100."

Located in Stuttgart, SEL is one of West Germany's premier telecommunications manufacturers, known for high quality digital switching systems, digital local networks, and wideband integrated fiber optic networks.

California museum receives two Amplica earth terminals

On the evening of October 1, with James Beggs, Administrator of the National Aeronautics and Space Administration, as honored guest, the California Museum of Science and Industry in Los Angeles, California, showed off its latest acquisitions—two Amplica-Comsat C-Band earth terminals. Donated and installed by Amplica-Comsat, the earth terminals are being used to receive transmissions from the U.S. Government's GOES weather satellites and Space Shuttle and other space activities coverage of the NASA/Select television channel.

On the Comsat side, the effort was spearheaded by Comsat Director Admiral Robert Garrick and A. William Perigard, President of Comsat Technology Products (CTP). Amplica is a part of CTP. Each terminal consists of a CSR-300 A receiver, a 9-foot diameter dish antenna, and an 85-degree low noise amplifier, all Amplica-Comsat products.

Early in 1986, the terminals will be used to monitor the Uranus flyby and the first Teacher in Space Shuttle mission. In addition, there are plans to make a similar installation at the California Pavilion of the upcoming World Exposition in Vancouver, British Columbia.

Continued next page

Statement about tariff action issued by Comsat International

Comsat International issued the following statement concerning the Federal Communications Commission (FCC) decision to allow all of Comsat International's new tariffs to go into effect as scheduled, on November 1, 1985: "We believe the Commission acted responsibly and in support of the public interest. It rejected outright all requests from potential competitors to Comsat International for the rejection or suspension of these tariffs, but set certain issues related to Comsat International's jurisdictional multipurpose earth station tariffs for further investigation.

"We are also pleased that the Commission declined all requests that it investigate the rates that Comsat International proposes to charge for its new competitive services. The Commission concluded that the accounting practices and corporate structure already implemented by the Corporation are sufficient to permit Comsat International to compete on an equal regulatory footing for the full range of its international services."

Commenting on the actions, Comsat International President William Taylor remarked, "We believe that this order will allow Comsat International to move swiftly forward in the important and growing market for end-to-end and specialized international communications services. While we remain concerned that several tariff issues impacting Comsat International's jurisdictional multipurpose earth station businesses have been set for investigation, we also note that the Commission dismissed a wide range of arguments and has stated that these tariffs represent a worthwhile attempt to achieve a justified, reasonable and nondiscriminatory rate. Furthermore, we are confident that once the Commission has had an opportunity to review Comsat's and Comsat International's submission in the investigation proceeding, it will also conclude that the jurisdictional rates are justified and supported by the public interest."

TeleSystems ship terminal has type approval for Japan

The MCS-9100 maritime communications system of Comsat TeleSystems, Inc., has received Type Acceptance from the Japanese Ministry of Posts and Telecommunications. The MCS-9100 is the smallest, lightest, and most technologically advanced ship earth station available today. It is also the only ship terminal produced by a United States manufacturer to be type accepted by the Japanese. All ship earth stations must receive Type Acceptance from the Ministry of Posts and Telecommunications before they can be used aboard Japanese flag vessels.

Corporation to list on four Stock Exchanges in Europe

The Corporation intends to list its shares on the Stock Exchanges of Frankfurt, Germany, and Geneva, Basel and Zurich, Switzerland. Announcements of this intention were made by Comsat Chairman and Chief Executive Officer Irving Goldstein during separate luncheons held for the financial communities of Frankfurt and Zurich.

Mr. Goldstein explained, "We at Comsat are proud to join with many other American companies that have their shares listed on these major exchanges. The capital markets of Germany and Switzerland have been important to Comsat, and we expect to continue our involvement with them."

In 1983, Comsat issued US \$110,000,000 in convertible subordinated debentures to the international bond markets through a subsidiary. In 1984 and 1985, a Comsat subsidiary and Comsat, respectively, each issued US \$100,000,000 in Eurobonds. German and Swiss investors hold a large portion of all three issues and are active holders of Comsat stock as well.

Corporate Locations

Comsat

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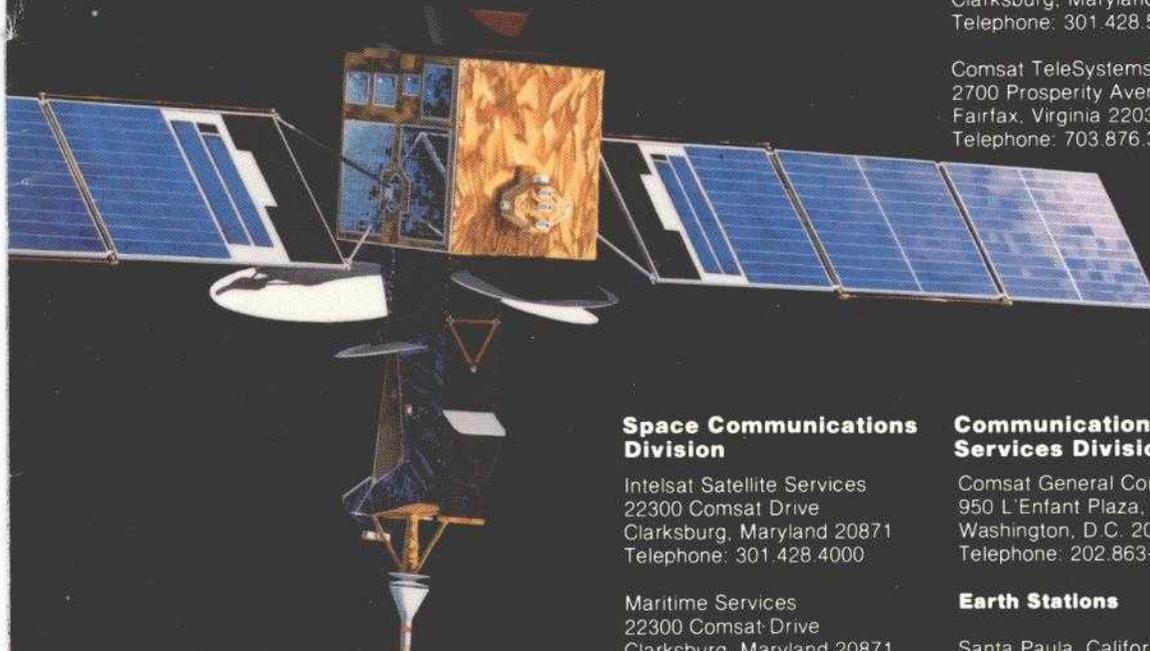
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Earth Stations

Santa Paula, California
Southbury, Connecticut
Fucino, Italy (Marisat TTC)

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950 L'Enfant Plaza, S.W.
Washington, D.C. 20024.2198
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Earth Stations

Andover, Maine
Brewster, Washington
Ebeye, Rep. of Marshall Islands
Etam, West Virginia
Jamesburg, California
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
Roaring Creek, Pennsylvania
Pulantat, Guam
Susupe, Northern Mariana Islands
Truk, Fed. States of Micronesia
Yap, Fed. States of Micronesia

Satellite Television Corporation
950 L'Enfant Plaza, S.W.
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Office of Corporate Affairs
Communications Department
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The Communications Satellite Corporation is a shareholder-owned corporation based in Washington, D.C. Comsat provides international communications services through the global satellite network of Intelsat and maritime communications services through the satellite capacity of Inmarsat. In addition, the Corporation provides customized communication systems and networks and markets end-to-end international communications and international earth station services and information and consulting services. Comsat also manufactures and markets a range of telecommunications products.

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Dr. Joseph V. Charyk retires. Irving Goldstein is Chairman and Chief Executive Officer. Marcel Joseph is President and Chief Operating Officer.

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In Mexico City, thousands die and a nation's international telecommunications system is ruined. Two Comsat products and scores of Comsat people prove that in a disaster satellite communications really comes through.

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Pop these suitcases open, do a little set up, and you can talk to almost any location on earth. The TCS-9000 is from Comsat TeleSystems, Inc.

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Comsat General's new SkyBridge satellite broadcast vehicle gives new meaning to the expression "live from the scene" for the television broadcaster.

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HI-NET—meeting the entertainment needs of the lodging industry. Partnership involving Comsat General and Holiday Corporation is on target to bring television programming to over 1,000 hotels.

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With Starcom, IBM computers communicate interactively in a protocol environment with excellent response times.

COMSAT