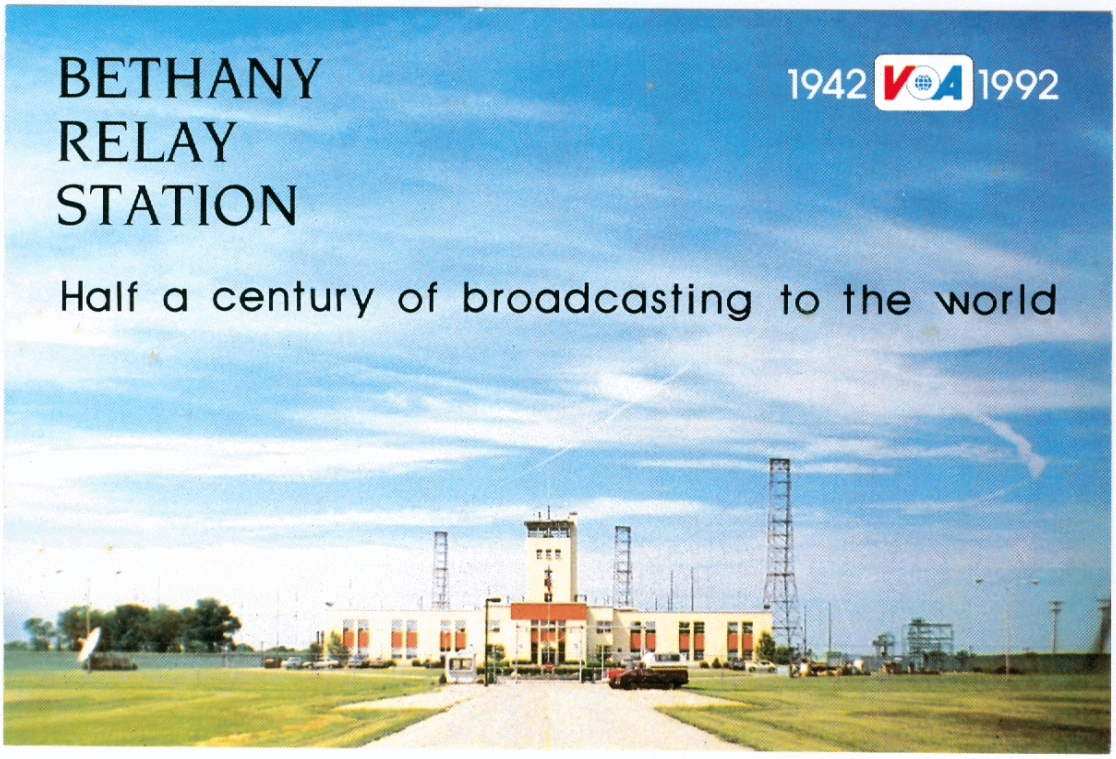
50 Voice of America Years of Broadcasting to the World



Welcome to

BETHANY RELAY STATION

OHIO

VOICE OF AMERICA

Compiled by David Snyder, 1994
Transmitter Plant Supervisor

Voice of America
Washington, D.C. 20547

ALBANIAN
AMHARIC
ARABIC
ARMENIAN
AZERBAIJANI
BANGLA
BULGARIAN
BURMESE
CANTONESE
CREOLE
CROATIAN
CZECH
DARI
ENGLISH
ESTONIAN
FARSI
FRENCH
GEORGIAN
GERMAN
GREEK
HAUSA
HINDI
HUNGARIAN
INDONESIAN
KHMER
KOREAN
KURDISH
LAO
LATVIAN
LITHUANIAN
MANDARIN
NEPALI
PASHTO
PERSIAN
POLISH
PORTUGUESE
ROMANIAN
RUSSIAN
SERBIAN
SLOVAK
SLOVENE
SOMALI
SPANISH
SWAHILI
THAI
TIBETAN
TURKISH
UKRAINIAN
URDU
UZBEK
VIETNAMESE

Voice of America
AT A GLANCE

TELLING AMERICA'S STORY

The Voice of America's first broadcast went on the air February 24, 1942, just 79 days after the U.S. entered World War II. The first program was a 15-minute presentation in German. Announcer William Harlan Hale opened the broadcast with the words: "Here speaks a voice from America."

Today, VOA broadcasts in 52 languages, including English, to listeners around the world. Every week tens of millions of listeners worldwide tune their shortwave, medium wave (AM) or FM radios to the Voice of America. They know they can rely on VOA for the most up-to-date and accurate news possible.

The Voice devotes a major portion of its broadcast schedule to news and news-related programs, as well as a variety of features on economics, science, medicine, technology, agriculture and music. All programming is produced in VOA's Washington, D.C. headquarters, which is equipped with 34 studios, a 150-channel master control and two centers to record reports from VOA correspondents around the world.

The Voice of America is the international broadcast service of the United States Information Agency. USIA was established in 1953 to carry out the overseas information and cultural exchange programs of the U.S. Government. On October 1, 1990, USIA established the Bureau of Broadcasting which includes the Voice of America and two other broadcast services, Worldnet Television and Film Service and the Office of Cuba Broadcasting (Radio and TV Marti).

COVERING THE NEWS

The reporters in VOA's central newsroom and correspondents at 26 news bureaus throughout the world write an average of 180 news stories every day. Part-time reporters -- known as "stringers" -- file in English and many of VOA's other languages, broadening the range of breaking stories.

VOA news bureaus are found in Abidjan, Bangkok, Beijing, Berlin, Bonn, Cairo, Chicago, Geneva, Hong Kong, Islamabad, Jerusalem, Johannesburg, London, Los Angeles, Miami, Moscow, Nairobi, New Delhi, New York, Paris, Prague, Rio de Janeiro, San José, Tokyo, Vienna and Warsaw. VOA also operates a program center in Amman, Jordan.

RELAY STATIONS

The Voice of America sends program from its Washington studios to its relay (transmitter) stations via satellite. From the stations, shortwave, and in some cases medium wave, transmitters broadcast VOA programs to listeners worldwide. Currently, VOA operates 13 relay stations abroad. These are located in Belize, Botswana (Silebi Pikwe and Moepeng Hill), Germany, Greece (Kavala and Rhodes), Kuwait, Morocco, Philippines, Sao Tomé, Sri Lanka and Thailand. There are also three VOA relay stations within the continental U.S, at Bethany, Ohio; Delano California; and Greenville, North Carolina. VOA constantly improves its relay station network. In addition, VOA is building a new site in Sri Lanka to replace its older existing station.

PLACEMENT PROGRAMMING

In recent years, VOA has begun to place more and more of its programming on local radio stations. To meet the demand, VOA established the Office of Affiliate Relations and Audience Analysis in 1991 to coordinate all placement activities. The office assists VOA services in making arrangements with stations throughout the world to carry their programs. Thirty-nine of VOA's 52 language services can place programs via satellite.

VOA uses a variety of placement techniques to tailor programs for each language service's needs and capabilities. They range from satellite-delivered programs to radio bridges to partnership broadcasts. A total of 2,000 hours of programming per week is now available to affiliate stations via satellite. Stations either simulcast the feeds or record them for later use.

VOA Europe is a special service in English that is relayed via satellite to European affiliate stations 24 hours a day. Designed for a young European audience, VOA Europe plays the latest musical hits from both sides of the Atlantic, presents American life and culture and reports world news and sports. It was created in 1985 to revitalize the cultural bonds between the United States and the new generation of Europeans. VOA Europe can now be heard in 369 cities and regions in 28 countries.

VOA FACTS

Staff: 3,074 Full-time permanent positions, including 662 foreign national employees.

Budget: Approximately $251 million for operating expenses in FY 1993 and an additional $104 million for modernization of the Bureau's broadcast facilities

(These figures include funding for Worldnet Television and Film Service.) This means that VOA's annual operating budget costs the American taxpayer approximately two cents per listener per year, quite a bargain in reaching 100 million listeners weekly.

VOA CHARTER

The VOA Charter is the document against which all VOA programming is measured. It was drafted in 1960 and signed into law (Public Law 94-350) by President Gerald Ford July 21, 1976. It reads:

The long-range interests of the United States are served by communicating with the peoples of the world by radio. To be effective, the Voice of America (the broadcasting service of the United States Information Agency) must win the attention and respect of listeners. These principles will therefore govern the Voice of America (VOA) broadcasts:

(1) VOA will serve as a consistently reliable and authoritative source of news. VOA news will be accurate, objective and comprehensive.

(2) VOA will represent America, not any single segment of American society, and will therefore present a balanced and comprehensive projection of significant American thought and institutions.

(3) VOA will present the policies of the United States clearly and effectively, and will also present responsible discussions and opinion on these policies.

Voice of America
Washington, D.C. 20547

Voice of America

THE RADIO BROADCAST SYSTEM OF THE UNITED STATES INFORMATION AGENCY

POLICY AND SCOPE

When the Voice of America first went on the air 79 days after the attack on Pearl Harbor on December 7, 1941, listeners all over the world were promised "the news from the war may be good or bad -- we shall tell you the truth." However, the means available to VOA to broadcast the truth to the world were operated by five commercial companies. In comparison, the Axis nations possessed a large network of high powered transmitters.

Today, -- more than 50 years later -- VOA's continuing mission to broadcast the truth is made possible by a sophisticated network of communication satellite circuits and transmitters with a total power of 25 million watts. The network includes 29 shortwave transmitters within the United States and 74 medium wave and shortwave transmitters at overseas relay stations. Most programs are delivered by satellite to VOA relay stations. This worldwide VOA network was created to overcome geographic and propagational obstacles that hinder clear, effective reception from transmitters in the United States. Using strategically located relay stations, the VOA is able to deliver a strong, reliable signal to almost any place in the world. In some cases, VOA relay stations are close enough to the intended audience that medium wave transmissions also can be used.

VOA WASHINGTON

The heart of the VOA is located in Washington, D.C., where VOA's total broadcasts of over 1,200 hours per week in 49 languages originate.

The Washington facilities consist of 34 studios, a central recording operation capable of producing more than 80 simultaneous recordings, and a master control switching complex. VOA's Master Control is one of the largest and most flexible switching consoles in existence. Through it, programs from VOA studios are fed by land lines, microwave, and satellite to transmitters in the United States for relay overseas, and by satellite directly to VOA transmitters overseas. The console can handle material from 150 sources and distributes up to 100 feeds simultaneously.

The VOA also operates an Electronic Audio News Center. This sophisticated solid state communications center, or "Bubble," daily receives, records, and distributes between 60 and 80 reports from VOA correspondents around the world. It operates twenty-four hours a day, seven days a week.

INTERFERENCE TO VOA BROADCASTS

One problem of international radio broadcasting that affects VOA cannot be solved by sophisticated network and technology. This is the interference caused to VOA by other countries either intentionally or unintentionally. Unintentional interference results from the overcrowding that exists in the shortwave broadcasting bands because the radio spectrum allocated to shortwave broadcasting is insufficient to meet the demands. Deliberate interference is referred to as jamming: this consists of abrasive sounding noises causing severe interference directed against VOA and other Western broadcasts by China, Cuba, Iraq, and North Korea.

TECHNICAL ASSESSMENT

VOA maintains a worldwide technical monitoring network that provides current data on signal strength and listening conditions. Every year the system collects millions of pieces of technical data on atmospheric conditions, signal strength, and interference that are fed through computer to enable VOA experts to evaluate current reception, make necessary corrections, and plan effectively for the future.

COMPETITION

Competition continues to grow in the field of international broadcasting. Since 1950, the number of transmitters around the world has increased from 385 to 1,580. It is estimated that there are about 1.5 billion radio receivers in the world. Of these, an estimated four hundred million are equipped to receive shortwave.

Voice of America
Washington, D.C. 20547

Voice of America

A Brief History and Current Operations

In an average week, all around the world, more than 130 million listeners tune their radios to the Voice of America, the global network of the United States Information Agency. But when extraordinary events take place, either in the United States or abroad, this basic listenership increases dramatically.

Today, the Voice broadcasts in 52 languages. The first VOA broadcast (in the German language) went on the air 79 days after the United States entered World War II on February 24, 1942. That broadcast included the statement:

Daily at this time, we shall speak to you about America and the war -- the news may be good or bad -- we shall tell you the truth.

This has been the aim of the Voice of America ever since.

The first U.S. Government broadcasts were to Latin America. These programs, however, were not identified as the "Voice of America." The first programs with the VOA identification were under the supervision of the Coordinator of Information. His responsibility was to carry information about the United States and its policies to all parts of the world except Latin America, which was the responsibility of the Coordinator of Inter-American Affairs.

A few months after VOA went on the air, the Office of War Information (OWI) was established, with the Voice of America as its radio division. The need to inform overseas peoples about the United States, its aims, culture, and history did not end with the cessation of hostilities. The function of the OWI and the Office of Coordinator of Inter-American Affairs was placed under the Department of State. In January 1948, the Congress enacted legislation (Public Law 402, the Smith-Mundt Act) to "promote better understanding of the United States in other countries." This act established the information program as a long-term adjunct of United States foreign policy, with VOA as an integral part.

The Hoover Commission, in its Reorganization Plan #8, recommended that the information program be separated from the State Department. Congress approved, and on August 1, 1953, the United States Information Agency, of which VOA was a part, came into being as an independent agency reporting directly to the President, but taking policy guidance from the Department of State.

From its origins in 1942 to the present, the Voice of America has varied its broadcasting activities, depending on the availability of facilities, the size of its appropriations from Congress, and the international situation. During the first few months of its operation, VOA broadcast in English, German, French, and Italian. At the wartime peak, VOA was broadcasting in some 40 languages. At the end of the war, the schedule was reduced to 24 languages. During the Korean War, expansion brought the number of languages to 46. Twelve of these were dropped in 1953. In 1955, direct shortwave broadcasts in Portuguese to Portugal were started. VOA programs in English are heard throughout Europe and around the world.

Radio is the only regular means of

communicating America's story to large audiences throughout the world. Today, the Voice of America broadcasts in 52 languages. They are:

Albanian	Amharic
Arabic	Armenian
Azerbaijani	Bangla
Bulgarian	Burmese
Catonese	Creole
Croatian	Czech
Dari	English
Estonian	Farsi
French	Georgian
German	Greek
Hausa	Hindi
Hungarian	Indonesian
Khmer	Korean
Kurdish	Lao
Latvian	Lithuanian
Mandarin	Nepali
Pashto	Persian
Polish	Portuguese
Romanian	Russian
Serbian	Slovak
Slovene	Somali
Spanish	Swahili
Thai	Tibetan
Turkish	Ukrainian
Urdu	Uzbek
Vietnamese	

Since 1942, the Voice of America has developed an integrated network of over 100 transmitters in different parts of the world. All broadcasts originate in Washington, D.C. and are transmitted by microwave, landline, and satellite to 29 transmitters in the United States and to 74 transmitters at 13 relay stations overseas. The U.S. transmitters are located in Greenville, North Carolina; Bethany, Ohio; and Delano, California.

The 74 VOA transmitters in other countries include those in Belize; Tangier, Morocco; Munich, Germany; Kavala and Rhodes, Greece; Woofferton, England; Kuwait; Porro and Tinang, Philippines; Sao Tomé; Bangkok and Udorn, Thailand; Colombo, Sri Lanka; and Selebi-Phikwe, Botswana. At Porro and Bangkok, VOA has medium wave transmitters of a million watts power each. The total power of VOA transmitters worldwide is 25 million watts.

The headquarters for the Voice of America is in Washington, D.C. It was originally located in New York City, but was moved to Washington in 1954.

VOA maintains news bureaus in Chicago, Los Angeles, and New York. Overseas VOA correspondents cover stories from Abidjan, Amman, Bangkok, Beijing, Berlin, Bonn, Cairo, Geneva, Islamabad, Jerusalem, Johannesburg, London, Moscow, Nairobi, New Delhi, Paris, Prague, Rio de Janeiro, San José, Tokyo, and Vienna. In addition to its own correspondents, VOA is able to call upon many part-time reporters in the United States and overseas to provide program material.

In addition to its direct broadcasts, VOA now places many of its programs on local radio stations around the world. Local stations receive material via satellite or through pre-recorded taped material. VOA uses a variety of placement techniques to tailor programs for each language service's individual needs and capabilities. They range from satellite delivered programs to radio bridges to partnership broadcasts. A total of 2,100 hours of programming per week is now available to affiliate stations via satellite. Stations either simulcast the feeds or record them for later use.

U.S. Information Agency offices abroad also originate radio programs in approximately a dozen languages for use on local stations. Parts of these programs are based on VOA's supplied tapes and scripts.

The Voice of America Radio Marti Program began broadcasting to Cuba on May 20, 1985. Created by Public Law 98-111, the

Radio Marti Program broadcasts 24 hours daily. Programs include news, commentaries, interviews, short features, music, popular dramas, and in-depth focus programs on current affairs. The broadcast headquarters are in Washington, D.C., news and program bureaus are located in Miami and a transmitter in Marathon, Florida.

In October 1985, VOA resumed broadcasting to Western Europe for the first time in 25 years. The new service, VOA Europe, is a special service in English that is relayed via satellite to European affiliate stations 24 hours a day. Designed for a young European audience, VOA Europe plays the latest musical hits from both sides of the Atlantic, presents American life and culture, and reports world news and sports. It was created in 1985 to revitalize the cultural bonds between the United States and the new generation of Europeans. VOA Europe can now be heard in 242 cities and regions in 25 countries.

The day-to-day operation of the Voice of America is guided by the words of the VOA Charter, which became law on July 12, 1976, when Congress passed a new section of the law under which VOA operates:

The long-range interests of the United States are served by communicating directly with the peoples of the world by radio. To be effective, the Voice of America must win the attention and respect of listeners. These principles will govern VOA broadcasts.

1) VOA will serve as a consistently reliable and authoritative source of news, VOA will be accurate, objective, and comprehensive.

2) VOA will represent America, not any single segment of American society, and will therefore present a balanced and comprehensive projection of significant American thought and institutions.

3) VOA will present the policies of the United States clearly and effectively, and will also present responsible discussion and opinion on these policies.

All newscasts broadcast by VOA daily are carefully prepared. In the handling of any unofficial material about which there may be some doubt, the details must be verified by a minimum of two independent sources. Accuracy is placed ahead of speed, although VOA news must compete with other international and national broadcasters.

While VOA is part of the United States Government, the viewpoints of opposition leaders and other important segments of American public opinion are presented in an effort to provide perspective and balance. The editorial opinions of American newspapers and radio and television commentators are used to inform foreign audiences about the attitudes and opinions of the American people on subjects of international interest. Significant national figures are interviewed regularly on a wide variety of subjects -- cultural, scientific, economic, social, etc.

Music, sports, and the lighter aspects of American life are included in VOA broadcasts. For example, the program "Music USA," which includes jazz and popular music, has been on the air since 1955 and has attracted a tremendous audience around the world, especially in Eastern Europe and the Newly Independent States.

The Voice of America reflects what is happening in this country and the world. It informs, it explains, it enlightens. It provides a background and a context in which a listener can better understand the how and the why of what is going on in the United States.

Voice of America
Washington, D.C. 20547

Voice of America
Fine Tuning

BY KIM ANDREW ELLIOT
Chief of VOA Audience Research

At VOA, we endeavor to verify correct reception reports, although it is difficult to inspect each report minutely to make absolutely sure that the program details or transmitter sites are accurate. One of the biggest problems in translating reception reports into useful frequency guidance is that most of our listeners use radios that do not have precise frequency readout. Digital radios with direct frequency readout are either unavailable or too expensive in most countries.

Though international broadcasters no longer rely on DXers as they once did, DXing is an excellent hobby, and collecting QSL-cards from as many stations in as many countries as possible is an important part of that hobby. Just as I can sympathize with the broadcasters' disappointment in not receiving more substantive program comments, as an occasional DXer I can also relate to the QSL-card collectors. The DXers may now have to mobilize and organize to save the QSL-card tradition. Perhaps one argument in the DXer's favor is that many younger people developed a considerable knowledge of the world by collecting QSL-cards.

Meanwhile, there has recently been a new development in QSL-card collecting in the United States. The Association of North

American Radio Clubs (ANARC) has formed a Committee to Preserve Radio Verifications. One of its major goals is to have DXers bequeath their QSL-card collections, many of which include some fascinating verifications from many decades ago, to ANARC's new permanent repository.

Thus, as another argument in the DXers' favor, if QSL cards become a thing of the past, so will much of the historical record and heritage of international radio.

And so the needs of the DXers and the needs of the international broadcasters, both legitimate, seem to be somewhat at odds. At the EDXC conference in Antwerp, Belgium, Wolf Harranth of Austria aptly described the situation: "It's the story of the bottle and the contents" he said. "The broadcaster is primarily interested in the contents, DXers are primarily interested in the bottle."

Voice of America
Washington, D.C. 20547

Voice of America
THIS IS BETHANY

On September 23, 1944, the Office of War Information, the Office of the Coordinator of Inter-American Affairs and the Crosley Corporation (later, the Crosley Broadcasting Corporation), officially dedicated three new 200 kW transmitters at Bethany.

This was the culmination of a new adventure in the field of radio engineering. Nearly two years of planning, designing and building had preceded the dedication at Bethany. This was the end of a trail that started with an urgent war necessity, and the beginning of another trail that led forward to a new kind of air-wave supremacy for the United States of America. This was the "loudest voice in the world" trying its young lungs.

The story of Bethany goes back far beyond Pearl Harbor. In the early days of high-power, high-frequency broadcasting, when 10 kW was the maximum power, Crosley's staff had already built a 50 kW transmitter long before the FCC made that output a license requirement. Through continuation of these experiments, tubes were developed capable of 75 kW, and in 1940, a momentous dedication was held of the most powerful shortwave station in this country at that time, WLWO.

On that fateful December Sunday in 1941 when bombs rained down on Pearl Harbor, Uncle Sam was pitifully inferior to his Axis enemies in international broadcasting facilities. Six international licensees were operating only 14 shortwave stations, several of which were incapable even of 50 kW output. In contrast to this, Germany had at least 68 shortwave transmitters under her control and Japan controlled 42.

In a drastic effort to remedy this situation, the Board of War Communications called a conference in Washington, D.C., at which all international radio licensees, equipment manufacturers, representatives of the Federal Communications Commission, Office of the Coordinator of Inter-American Affairs, Department of State and others, studied the psychological warfare situation. At this and subsequent meetings, plans were made to remedy the situation and an important part of those plans was the design and construction of six 200 kW transmitters. The job of designing, manufacturing and installing these transmitters was given to the Crosley Corporation. Under the leadership of R. J. Rockwell, Vice President and Director of Engineering of Crosley, the Engineering Staff went to work. As part of this mammoth program, Crosley undertook to redesign its equipment for an output of 200 kW. Tubes were designed and developed, circuits were calculated and antennas were devised to do the job. Recalls Mr. Rockwell, "There were a few 'impossibilities' involved - there were no vacuum tubes, no output circuits, no antennas in existence capable of such power. The tubes, particularly were a serious problem. They had to be designed, then built, and finally they had to operate."

The wartime use of these stations is a well-known story; they were a vital link in the worldwide broadcasting system used by the Office of War Information and the Office of the Coordinator of Inter-American Affairs. The impact of these broadcasts to the Axis countries was reflected in Hitler's statement calling this operation "The Cincinnati Liars."

When the war ended, Crosley's

shortwave station became an implement of policy programmed exclusively by the State Department. The pairs of stations which during the war and for sometime afterwards were known as WLWL, WLWS and WLWR. In the 1950s these transmitters were operated under the call letters WLWO-1, 2, 3, 4, 5 and 6.

In the early 1960s, the Government took over the operation of the station. The station has gone through two major modernizations. In the mid- 1960s, the World War II Crosley slave transmitters were removed from the west side of the building and three Collins Radio 821-A1 250 kW broadcast transmitters were installed. Included in the modernization was a master control room located in the center of the transmitter operations area. Also installed were two Continental Electronics 617A 50 kW P-E-P independent sideband transmitters for program relay and other communications purposes. In 1989, after 45 years of daily use, the remaining Crosley transmitters on the east side of the building were replaced with three ABB SK53 C3 250 kW broadcast transmitters.

The Bethany Relay Station uses 22 directional antennas. Fourteen of them are rhombic type in groups of 2 or 3, and eight are curtain type antennas. The antenna switching matrix consists of 232 manually-operated switches that allow connection of any of the six broadcast transmitters to be connected to any of the 22 antennas and test load. There are more than 1000 wood poles ranging in height up to 150 feet, supporting antennas and transmission lines.

The Bethany Relay Station transmits about 40 hours of programming per day to Africa and Latin America on 18 frequencies from 6 to 22 MHz. All programming originates in Washington, D.C. and is sent to the station via satellite. The full staff of 22 consists of Administrative, Facilities, Logistics, Rigging personnel and 15 Electronic Technicians who operate the station 24 hours per day.

Adapted from an article written in 1960 by R. J. Rockwell, Vice President and Director of Engineering for the Crosley Broadcasting Corporation.

Voice of America
Washington, D.C. 20547

Voice of America
Modernization of the Voice of America

In 1982, the National Security Council directed the Voice of America (VOA), currently housed in the Bureau of Broadcasting of the United States Information Agency, to provide a stronger, more reliable signal into areas of the world important to U.S. interests. In fiscal year 1983, a formal modernization program began with the recruiting of a skilled engineering and technical staff. Detailed studies and plans for an updated relay station network for a stronger "Voice" followed soon afterward.

WHY MODERNIZATION IS NEEDED

America's international broadcasting system falls short of modern international standards and is increasingly difficult to maintain. Of the 114 transmitters in VOA's global network, about three quarters are more than 20 years old, almost half have been in operation more than 30 years and 4 were manufactured over half a century ago. For these old transmitters, some replacement parts have to be specially fabricated because they are no longer manufactured. Deteriorating technical facilities restrict VOA from delivering a high-caliber signal to listeners in many parts of the world.

Other major international broadcasters are using newer, more powerful transmitters that incorporate technical advances made in recent decades. The present international standard is the 500 kW shortwave transmitter which is dramatically more efficient than older models and more than twice as powerful as most of the transmitters VOA has been using. France, West Germany, Great Britain, the former Soviet Union, Iran and Saudi Arabia use these more powerful transmitters, and many smaller countries have begun installing and operating them.

Since available frequencies are limited and the worldwide listening audience has several attractive alternatives, VOA must provide strong and clear signals into its major target areas to remain competitive. Otherwise, VOA can expect a continual decline in the VOA listening audience and a diminishing capacity to have America's Voice heard.

Audience research data attests to the level of competition VOA faces in the world listener marketplace and to the need for a strong, unclouded signal to attract audiences. VOA already lacks a competitive signal in most of Africa, throughout India and many parts of South Asia, in areas of China, portions of the Middle East and other regions vital to U.S. interests. The BBC, Deutsche Welle, and other countries' radio stations sound loud and clear in many of these areas. Even during the Persian Gulf crisis, VOA came in a far second to the BBC which claimed almost half of the listening audience in the region.

CHANGE IN VOA MODERNIZATION STRATEGY

Despite the profoundly changed political landscape since the modernization program was first launched, strong impact for the program has remained. Unfortunately, fiscal realities have caused VOA to alter its ambitious original course and to reexamine how the limited resources available can best be used to meet broadcast needs. A March 1989 report, "An Agenda for Action," set the scene for a new strategy and outlined specific recommendations to achieve optimal broadcast coverage within the tight fiscal times. The streamlined long-range plan encompassed only high priority, new construction, upgrade/refurbishment of existing facilities, continued enhancement of operational effectiveness and appropriate pursuit of new service opportunities. VOA's revised blueprint for modernization placed increased emphasis on extending the effective use of existing facilities for as long as possible through a concerted upgrade/refurbishment effort.

Each year VOA assesses and finetunes its plan to maintain momentum and to provide a comprehensive approach to fulfill mission goals. In the fall of 1991, VOA modified its contracting approach to accelerate project completion and to reduce costs in the overall modernization program.

Elements of VOA's current modernization strategy include:
--Completion of the new shortwave stations in Morocco and Thailand. These important projects are planned to be completed by fiscal year 1994.

--Completion of the Satellite Interconnect System which will link VOA studios with all major relay stations. This advanced technology will dramatically improve the quality and reliability of VOA's program feed and concurrently reduce costs.

--Continued refurbishment of old facilities. Major changes in each station's complement of equipment are required. As equipment ages, the quality of coverage decreases further. Adequate annual funding of relay station refurbishment is essential to prevent further erosion of mission capability.

--Adequate and timely maintenance and repair (M&R) projects to keep the old technical infrastructure "glued" together and the new facilities in prime working order. To address the needs of 12 relay stations worldwide, VOA engineers may have 75 to 100 projects in various stages of planning, design and construction. These projects encompass a gamut of facilities that together comprise an operating relay station: transmitters, transmission lines, antennas, towers, roads, buildings, power plants, electrical systems, water systems and sewage systems.

--Pursuit of a new way of doing business. Even after new facilities are completed, VOA will continue to have gaps in broadcast coverage, and a low-cost means of closing these gaps is critical. Placing VOA programs on AM and FM stations in countries with competitive or developing media is becoming increasingly more important. VOA currently uses placement services to reach important audiences in Western Europe, East Asia, Pacific Ocean areas and Latin America. In the opening of societies of Eastern Europe and the former Soviet republics, placement serves as an effective complement for shortwave broadcasts of lower technical quality. Closed societies, however, cannot be reached through placement nor can placement services be considered reliable during times of crisis.

--Continued development and promotion of Direct Broadcasting Satellite-Radio (DBS-Radio). Although shortwave is expected to remain the backbone of VOA broadcasting for several decades to come, DBS-Radio, when fully operational, would enable a listener to receive high-fidelity radio broadcasts directly from a satellite.

VOA has been working closely with NASA, the Department of Commerce and the Federal Communications Commission to ensure that development of this advanced technology is encouraged and that U.S. interests at upcoming international frequency allocation conferences are well represented.

VOA's current strategy embodies an ongoing analysis of network needs to meet mission goals within the confines of budgetary constraints. It is an effort to rebuild the "Voice" and to maintain a viable broadcast capability with fewer resources.

Unforseen political events and natural disasters have further hampered measures to bring the network into the modern electronic age and to fulfill VOA's critical public diplomacy mission. With the Iraqi invasion of Kuwait in August 1990 and the consequent Persian Gulf War in January 1991 came an upsurge of focused broadcasting. The Gulf crisis prompted a shift of resources that effectively served new requirements to the Middle East but strained coverage to other areas. In September 1990, VOA was forced to cease broadcasting from its 10 transmitter shortwave facility in Liberia; the result -- VOA coverage to most of the continent of Africa was devastated. Catastrophic natural disasters have damaged VOA facilities in Ohio, North Carolina, Greece and the Philippines. Particularly hard hit was the Philippines Relay Station which has not only suffered damage from typhoons, an earthquake and the recent Mt. Pinatubo volcanic eruption but is subject to security concerns stemming from insurgent activity in the country.

PROGRESS SO FAR

Many accomplishments have been achieved since the modernization program was initiated and a new course was charted.

Bahrain: During Operation Desert Shield/Storm, policymakers and engineers combined efforts to establish an emergency medium wave station in Bahrain. Within 90 days, this 50 kW medium wave transmitter site was broadcasting VOA programs to listeners in the region. Since the conclusion of the Persian Gulf War until May 1992, the Bahrain Relay Station has continued to deliver VOA programs in this area where coverage has been weak.

Belize: Almost a year and a half after clearing 240 acres of jungle, VOA began broadcasting from a temporary VOA station near Punta Gorda in September 1986 with two 50 kW transportable medium wave transmitters. Because of the strategic importance in this location, VOA started the design of a permanent site in June 1987. With the completion of construction and the installation of two more powerful 100 kW medium wave transmitters, a strengthened VOA went on the air July 3, 1990, delivering programs to listeners in Central America.

Botswana: In response to the loss of the Liberia Relay Station and to the desperate need for coverage in sub-Sahara Africa, VOA completed the rapid deployment of a temporary shortwave station at Moeping Hill in northeast Botswana. The initial two of the four transmission systems, each with an independent engine/generator, 100 kW transmitter and antenna, became operational in December

1991. The final two transmission systems became operational in April 1992.

In addition, a new medium wave station was started in 1991 at another site in Moeping Hill with the purchase of a 500 kW medium wave transmitter and with the award of the facilities contract.

Morocco: The new state-of-the-art relay station with ten 500 kW shortwave transmitters is operational delivering strong signals into Eastern Europe, former western Soviet Union, Middle East, Southwest Asia and West and Central Africa.

Thailand: The new state-of-the-art relay station near Udorn with seven 500 kW shortwave transmitters is operational delivering strong signals to China and Southwest Asia.

Germany: In April 1986, VOA entered into a lease agreement with Germany for use of four modern 500 kW shortwave transmitters and associated antennas at a Bavarian radio facility in Wertachtal. Use of these powerful transmitters for delivery of VOA programs to Eastern Europe, the Middle East, former Soviet republics, northern Africa and South Asia has enabled VOA to retire some antiquated shortwave transmitters from service.

Sri Lanka: Following a 1989 visit to Sri Lanka, a team of VOA engineers outlined a refurbishment initiative to fill critical coverage gaps in China, South Asia, the Middle East and Southern and Eastern Africa. Using its modified contracting approach to bring a refurbished Sri Lanka Relay Station on the air as soon as possible, VOA awarded a contract for a complete shortwave station near Chilaw on the west coast of Sri Lanka. Replacing one of VOA's oldest and most seriously underpowered stations in Colombo, this new facility will include three transmitters and associated antennas.

Rhodes: A refurbishment project was initiated in 1991 to replace existing medium wave and shortwave antennas. A refurbished Rhodes Relay Station will enhance delivery of VOA programs to the Middle East.

Sao Tomé and Principe: To overcome the loss of the Liberia Relay Station, VOA is building a new station in Sao Tomé to renew coverage of the African continent.

Kuwait: The Persian Gulf War gave the Bureau of Broadcasting an excellent opportunity to establish a medium wave broadcast capability in the Persian Gulf region. The permanent facility will provide a highly desirable medium wave coverage to a broad area of the Middle East and near regions of South Asia.

Bethany: Attention was focused in early 1989 on updating the antiquated Bethany plant. Parts for many of the old, inefficient transmitters were no longer available, and often extensive maintenance was required to prevent undesirable spurious signals that could interfere with other radio systems. Three 45 year old transmitters were taken out of service on November 7, 1989, and on November 1, 1991, three more powerful 250 kW shortwave transmitters were energized to begin broadcasting a strengthened signal into Africa and Central and South America.

Delano: Improvements under the modernization program began at this California site in 1985 when four 250 kW shortwave transmitters replaced three original transmitters that had been in service for 40 years. Progress continued in 1988 with the installation of a high-gain, multi-band curtain array antenna. This computer-controlled antenna allows the transmitter signal to be rapidly switched and the antenna pointed toward various reception areas with a simple key stroke. In early 1989, a computer-controlled audio routing switcher was added to streamline operations.

Greenville: This 16 shortwave transmitter facility, the largest in the domestic relay station network, has served as an important "laboratory" for VOA's effort to upgrade its worldwide facilities. Four 500 kW transmitters of contemporary design were purchased and installed at Greenville to assess the state-of-the-art in transmitter design and to determine specific

requirements for VOA's new stations. In addition, a prototype of the computerized data gathering and control system planned for VOA's relay stations is under development. The North Carolina facility also is serving as the test site for a versatile new antenna design that is planned for use in VOA's new stations.

Caribbean Coverage: In accordance with the compressed modernization plan, a proposed station in Grenada was canceled, the temporary broadcasting facility in Costa Rica was closed in FY 1989, and the temporary facility in Antigua was closed in FY 1991. To maintain coverage of the Caribbean, VOA is leasing broadcast time on BBC's Radio Antilles facility in Monserrat. To improve signal reception, VOA provided BBC with a new 100 kW medium wave transmitter in 1992 in trade for broadcast time.

Network Control Center (NCC): A new facility for central network control and management of relay stations and feed systems has been constructed and is in operation 24 hours a day. The installation of associated computer and electronic equipment is complete and software continues to be developed. The NCC routes Washington-produced programs to VOA stations around the world, maintains a continuous awareness and display of the status of all broadcasting-related equipment in the global network and assists relay stations in accomplishing

their broadcasting missions.

Satellite Interconnect System (SIS): Two-way SIS earth stations are operational in Washington, D.C., Bethany, Delano, Greenville, Belize, Botswana, Tinang, Porro, Thailand, Morocco and Munich. Receive-only SIS earth stations are operational in Tangier, and Gloria, Portugal. SIS has significantly improved the reliability of the signal feed to these stations. Additionally, the Delano Relay Station serves as a Pacific Ocean gateway, the Greenville Relay Station serves as an Atlantic Ocean gateway and the Munich Relay Station serves as an Indian Ocean gateway. Receive-only stations are serving in United Kingdom, Kavala, Rhodes, Kuwait and Sao Tomé.

Television Receive-Only (TVRO): The TVRO network began in 1985 in Europe and expanded over the next three years to a worldwide service reaching 150 USIS locations overseas. During the last four years, the service capabilities were expanded to include multiple audio and data channels for VOA language services and USIA's Wireless File text service. The TVRO network now reaches over 300 sites worldwide including USIS posts, Culture Centers, America Houses, Embassies, radio and TV broadcast stations and VOA relay stations.

Studios: Half of the 34 broadcasting studios and booths have been completely refurbished in the last ten years.

Master Control: A newly refurbished Master Control, the switching center for all studios and other audio sources, replaced the 1950s vintage formerly used. The new Master Control doubles the capacity of the old unit and provided a smooth interface with the NCC.

Audio Processing: Studies on appropriate techniques of audio processing have provided guidance for acquiring a new generation of equipment that will significantly improve VOA broadcast signal clarity.

Automated Control: A new scientific computer (DEC 8300) provides an in-house capability to predict broadcast performance through use of sophisticated mathematical models and to determine the most effective use of the overall network. A parallel computer system monitors moment-to-moment status of critical components in the broadcasting network and assists management in all communications between Washington and the relay stations through the NCC.

System for News and Programming (SNAP): An innovative system for management of text materials in the Washington headquarters and in the New York and London news bureaus has been installed. This computer-based system allows writers faster access to English texts of news materials and assists in preparing foreign language scripts even in non-English writing systems such as Arabic, Chinese and Russian.

Other Initiatives:

--Pacific Islands: To supplement broadcasting from the highly vulnerable Philippines Relay Station and to provide a new broadcast path to Asia, VOA is exploring the possibility of constructing a new shortwave relay station on a site in the Pacific Ocean.

WHAT REMAINS TO BE DONE

Even with the momentous strides made, VOA's ability to compete with other major international broadcasters is burdened by a largely obsolete technical infrastructure and is handicapped by severely constrained funding. Many years of intense activity remain ahead before the global relay station network can fill the glaring gaps in reliable service and substantially improve its poor competitive posture.

Certain issues need to be resolved to keep progress on track. Appropriate legislative initiatives could give VOA sorely needed flexibility to accommodate its restricted budget. For example, VOA could better fulfill its mission if it could directly reinvest the proceeds of selling, leasing, or exchanging real property rather than returning these proceeds to the general treasury.

VOA must have adequate resources to undertake essential negotiations with foreign governments. Agreements that permit the operation of existing facilities are expiring and have to be renegotiated to prevent any possible disruption of service. Agreements to permit major refurbishments or the replacement of major new facilities such as SIS also must be negotiated soon to maintain progress.

Increased emphasis on media and audience research is essential for making the difficult decisions to bring VOA's broadcasting mission in line with budget realities. A lack of detailed listener data hampers analysis and inhibits network planning. A modest investment in audience and media research will pay enormous dividends in more effective targeted programming, better selection of media alternatives to reach bigger audiences and identification of firm and validated requirements to guide engineering projects. Effective monitoring also is critical to assure adequate reception quality and to validate use of local placement material.

The steady upgrading of existing broadcasting facilities coupled with the dispersal of network assets among fewer, smaller stations of generic design and flexible facilities will enable America's Voice to become stronger and less susceptible to silencing.

Voice of America

Washington, D.C. 20547

Voice of America
Office of Cuba Broadcasting

The Office of Cuba Broadcasting was established in 1990 to oversee all programming broadcast to Cuba on the Voice of America's Radio Martí and TV Martí. In keeping with the principles of the VOA Charter, both stations offer their audiences accurate and objective news and information on issues of interest to the people of Cuba.

RADIO MARTÍ

Radio Martí went on the air May 20, 1985, from studios in Washington, D.C. The broadcast marked a three-year, bi-partisan effort to provide the Cuban people "news, commentary and other information about events in Cuba and elsewhere to promote the cause of freedom in Cuba." The result was the Radio Broadcasting to Cuba Act (PL 98-111), signed by President Ronald Reagan on October 4, 1983. By law, Radio Martí broadcasts must be in accordance "with all Voice of America standards to ensure the broadcast of programs which are objective, accurate, balanced, and which present a variety of news."

Radio Martí is on the air seven days a week, 24 hours per day on medium (AM) and shortwave. The broadcasts include news, music and a variety of feature and news analysis programs. Audience reaction, including interviews with Cuban visitors to the United States, indicates that Radio Martí is widely listened to, enjoying an audience of over 70% of the population. It is considered the most popular in the island, despite Cuban government attempts to discourage listening and, since April 1990, jam Radio Martí's medium wave broadcasts in the Havana area.

Radio Martí is authorized 181 positions. Its budget for FY 1993 is $15.8 million.

NEWS

News and news-related programming are the staple of Radio Martí's broadcasts and comprise over half of the daily schedule. Radio Martí's objective and balanced news coverage fills the information gap resulting from 34 years of government control of the Cuban media.

The focus of the station evolved to give emphasis to news and stories with a Cuban angle, serving as the main source of reliable information for the people of Cuba. Human rights and democracy-building principles are now priorities in the programming. News sources include the Voice of America's news service, national and international wire services, direct telephone communication with the island, Radio Martí reporters and a network of stringer-correspondents around the world, including the Commonwealth of Independent States and Eastern European countries.

PROGRAMS

Radio Martí's programs offer a more comprehensive and balanced perspective on current events than listeners receive from the Cuban media. Features and special programs provide a wide range of entertainment and information without political overtones.

Some of Radio Martí's programming includes roundtable discussions; commentaries on political, economic, social, religious and human rights issues by experts; testimonies from former political prisoners, recent arrivals, and human rights activists; in-depth "focus" shows on current events; programs of special interest to women, youth and laborers; and discussions on literature and the arts.

RESEARCH

Radio Martí's research office provides the station's broadcasters with up-to-the-minute information on Cuban media reporting, analysis on events in Cuba, background for the news and programs departments and assessments of worldwide events for their impact on the Cuban people. The Office of Program Evaluation provides independent, objective evaluations of the station's effectiveness through the use of surveys and focus groups with recent arrivals to the United

States. The feedback obtained through these sources comprises one of the most valuable elements in program development.

TECHNICAL OPERATIONS

Washington - All programs are broadcast from studios in Washington, D.C.

Marathon Key, Florida - Facilities include a 50 kW transmitter operation on 1180 kHz (medium wave). The broadcast signal is fed by satellite from Washington to Marathon Key. Radio Martí also broadcasts on shortwave frequencies from Bethany, Ohio and Greenville, North Carolina.

Miami Bureau - Miami constitutes the largest concentration of Cubans outside of the island. As such, it is an important hub of information of great interest to Radio Martí's audience. Programs and special coverage produced by the Bureau are fed to Washington by satellite.

TELEVISION MARTÍ

Television Martí is intended to provide Cuban viewers with the same quality programming available to the other countries in the Western Hemisphere, including news, features on life in the United States and other nations, entertainment and sports (i.e., the World Series). It also provides commentary and other information about events in Cuba and elsewhere to promote the cause of freedom in Cuba.

TV Martí's Miami Bureau produces several news-analysis programs and provides daily reports of important events. TV Martí also benefits from the services of the Office of Program Evaluation for the development of new programs.

BACKGROUND AND BUDGET

In September 1987, following the success of Radio Martí, bi-partisan support in Congress provided $100,000 to the Advisory Board for Radio Broadcasting to Cuba to study the feasibility of implementing television broadcasts to Cuba. In 1989, Congress directed USIA to establish and test TV Martí, appropriating $7.5 million for a test program. On March 27, 1990, TV Martí began its test period, broadcasting to Cuba between 3:45 a.m. and 6:45 a.m. (later changed to 3:30 a.m. to 6:00 a.m.) on Channel 13. The late hours were chosen to avoid interference with local Cuban broadcasts. On July 27, 1990, President Bush notified Congress of the results of the initial test phase. In August 1990, the President officially made TV Martí a permanent part of the U.S. government when he signed a Presidential Determination that the station's test broadcasts had demonstrated their feasibility without causing objectionable interference to domestic U.S. television signals. The Determination was required under the Television Broadcasting to Cuba Act. TV Martí is authorized 139 positions, and the budget for FY 1993 was $12.6 million.

TECHNICAL OPERATIONS

TV Martí broadcasts from an aerostat tethered at an altitude of 10,000 feet above Cudjoe Key, Florida. Programming (consisting of originally produced news in addition to material acquired from commercial sources) originates in Washington and in Miami and is transmitted to the Florida Keys by satellite. The signal is then relayed to a transmitter and a highly directional antenna aboard the aerostat for broadcast to the Havana area. The TV Martí system has safeguards that prevent interference with existing domestic and foreign television stations.

SIGNAL STRENGTH AND JAMMING

The TV Martí transmission system delivers grade-A television signals to the Havana area. Massive jamming efforts by the Cuban government make it difficult to receive the signal in center city Havana. However, mobile monitoring indicates that intermittent reception is possible in some outlying areas of the city and in other parts of the Havana Province.

The U.S. Interests Section in Havana now plays videotapes of TV Martí broadcasts to over 500 people who visit their facilities daily.

BUREAU OF BROADCASTING

On October 1, 1990, the U.S. Information Agency, the parent organization of the Office of Cuba Broadcasting, established the Bureau of Broadcasting which incorporated the Voice of America, the Worldnet Television and Film Service and the Office of Cuba Broadcasting (Radio and TV Martí).

ADVISORY BOARD FOR CUBA BROADCASTING

The Radio Broadcasting to Cuba Act of 1985 required the establishment of a none-member, presidentially-appointed Advisory Board to review the activities of Radio (and later TV) Martí and to make recommendations to the President, the director of USIA and the director of USIA's Bureau of Broadcasting.

Voice of America
Washington, D.C. 20547

Voice of America

VOA'S NEW SATELLITE INTERCONNECT SYSTEM

BY GEORGE C. MACKENZIE, Jr.

Each year the Voice of America receives some complaints about the quality of its broadcast signals. A recent letter from Kampala, Uganda, states: "You have left your listeners in Uganda with only one handicap to complain about. VOA reception in this part of the continent is poor." VOA is aware that its signal does not always come in loud and clear. In some cases, the problem may be caused by the listener's distance from the relay station. In others, it may be due to the degradation of the audio quality of the signal as it is sent from Washington to the relay, or transmitter, station. Unfortunately, it's not always possible to build a relay station closer to VOA's listeners. However, it is possible to improve the means by which the signal is sent. That's exactly what the Voice of America is doing.

In September 1988, engineers at VOA inaugurated a Satellite Interconnect System (SIS) linking headquarters in Washington, D.C., and VOA relay stations in Greenville, North Carolina, and Delano, California. The Washington-Greenville-Delano link was only the beginning of SIS. In the last few years, VOA expanded this satellite network to include every relay station in the United States and around the world.

Right now, VOA's signal is transmitted through landlines, radio telephone, microwave, shortwave, and international satellites. Any combination of these modes can be joined together to form a circuit. "One of the things we're trying to improve with the SIS system is the quality, " says Jim Hulen, chief of VOA's Operations and Network Control Division.

Before the introduction of SIS, VOA used analog signals to transmit its programs. Analog signals are exact reproductions of sound. The electric current copies the pattern of sound waves of a speaker's voice. Since and analog signal is easily distorted by atmospheric conditions and has to go through several different types of transmission within the circuit, a relay station does not always receive a studio quality broadcast. And if a circuit fails, it's difficult to isolate the problem and restore service.

As VOA's hours of broadcasting have increased over the years, more circuits have been added. They're often pieced together using whatever means of transmission are available at the time. Until SIS, there had been no uniform plan to add programs to VOA's schedule except to lease a new circuit for each additional broadcast. VOA leased 43 individual circuits, covering 10 routes and signed 16 different leases with 7 countries to provide service to 15 relay stations. Needless to say, the numerous circuits created a complicated system that was often difficult to manage.

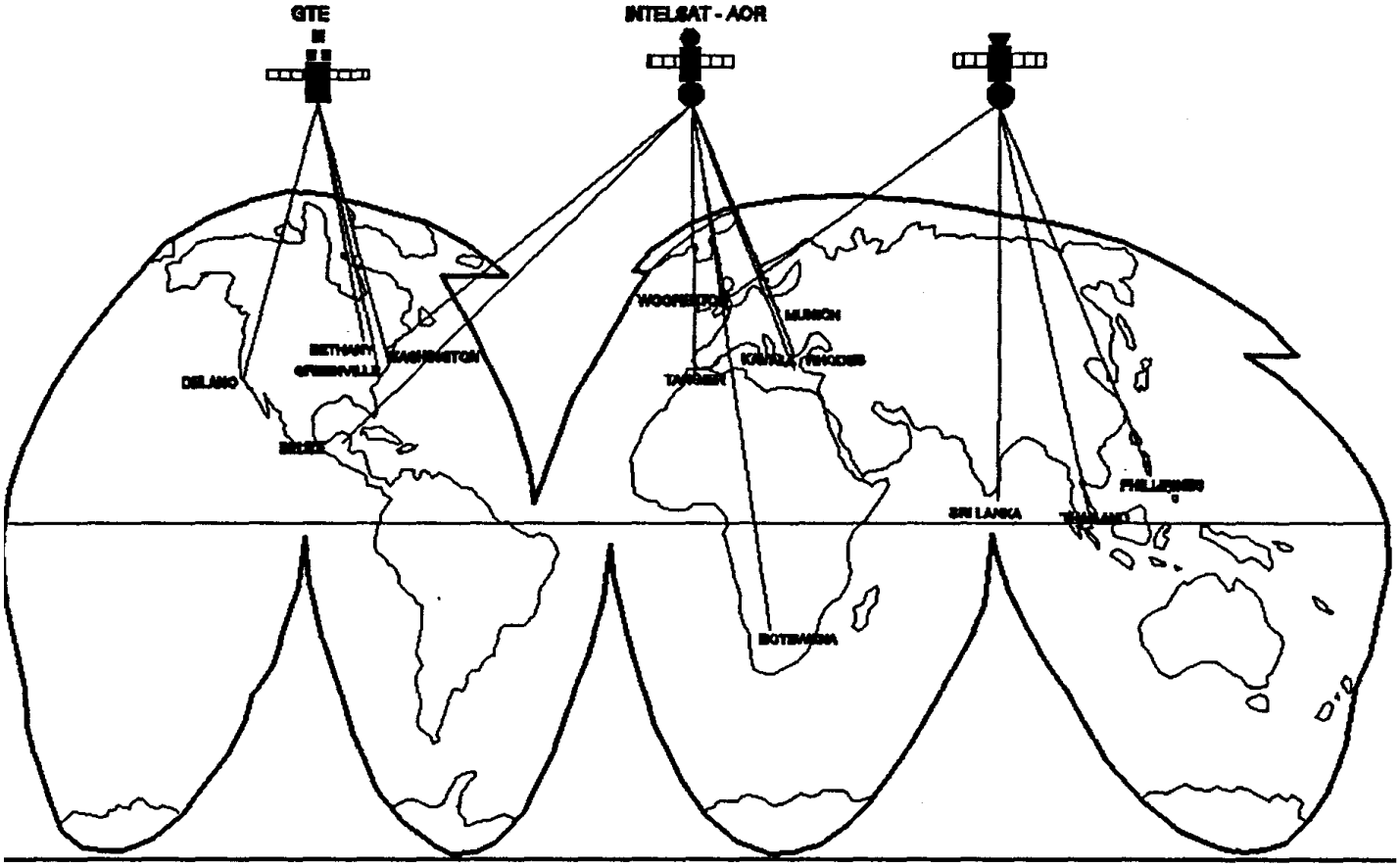
As the system had evolved, no provision was made for two-way communication. Washington maintained contact with its relay stations through Telex, telephone, or high frequency radio and it sometimes took as long as two days to receive information.
Under those circumstances, engineers found it difficult to recognize and deal with problems quickly.

The idea for a new comprehensive satellite system was originally conceived in 1983 as part of VOA's modernization program. The technology for the system has been used in the United States for several years. VOA, for example, first incorporated satellites into its existing system in 1976; back in those days, satellites were only used as one link within circuits. But as the technology evolved, VOA engineers realized that satellites had great potential for improving the quality of VOA' s broadcast signal. What was needed was a plan that adapted the satellite technology to VOA's needs. Devising the plan was the responsibility of VOA's Control and Communication branch headed by Clifford Guffee.

In 1984, VOA contracted with COMSAT, a corporation established by the U.S. Congress to promote the use of satellite communications, to develop the hardware for satellite earth terminals and the lease time for national and international satellite communications. In the years since then, COMSAT, guided by VOA has been

VOICE OF AMERICA

SATELLITE INTERCONNECT SYSTEM



assembling the links in the satellite system.

Part of the new system can be seen atop VOA headquarters in Washington. An antenna has been installed on the roof to send program broadcasts to relay stations in Bethany, Delano and Greenville through a U.S. domestic satellite. For international broadcasts, COMSAT has arranged for VOA to lease satellite time from the International Satellite Organization (INTELSAT), which was established to aid in the development of a global communication satellite system.

Four floor below the roof is the heart of the SIS: a new Network Control Center (NCC). NCC personnel rely on four terminals to coordinate all aspects of the system. One terminal is responsible for all outgoing program broadcasts. The second monitors two-way communications between Washington and the relay stations. The third is used for training, and the fourth is held in reserve for backup and maintenance. The terminals are connected to computers that are programmed to control SIS.

The new system will eliminate the need to use only one circuit for one program broadcast. At any given time during the day, VOA is broadcasting up to 16 different programs simultaneously. Under SIS, all broadcasts are multiplexed, or combined, into one digital signal for transmission. Digital signals are superior to analog because they do not accumulate noise during transmission and, therefore, contribute less distortion to the broadcast.

Within the United States, signals will be transmitted over a U.S. domestic satellite on a point-to-multipoint basis - for example, from

Washington to Bethany, Delano and Greenville. SIS will also use point-to-multipoint technology for international broadcasts. Through the agreement with COMSAT, VOA will lease time in INTELSAT satellites covering the Atlantic Ocean and Indian Ocean regions. Greenville will serve as a "gateway" relay station for overseas broadcasts. It will receive a signal, which could contain as many as thirty program broadcasts, from Washington via the U.S. domestic satellite. Greenville will then re-transmit the signal to the Atlantic Ocean region satellite, which will sent the signal back to earth over a wide area covering the Caribbean, Central America, Europe and Africa. All relay stations in the area of coverage will have satellite earth terminals to decode the signal and select the program they are scheduled to broadcast. A commercial relay station in England, from which VOA leases satellite time, will serve as a second "gateway" station, receiving the signal from the Atlantic Ocean region satellite and then re-transmitting it to INTELSAT's Indian Ocean region satellite which will cover relay stations in Asia. "With SIS, we multiplex all the programming together, send it to the satellite, and re-broadcast it to a multipoint area," says Jim Hulen, chief of the Operations and Network Control Division. "That means any station in that area can receive any program. Since programs for a particular time will be sent to all relay stations simultaneously, a program can be shifted from one relay station to another is there are technical difficulties.

SIS will also improve two-way communications between Washington and the relay stations. Engineers in Washington will have almost instantaneous access to information on the status of all VOA relay station throughout the world. They will be able to have two-way voice communication, listen to outgoing broadcasts, compare SIS signals with studio signals, and test the quality of a circuit before it is used for broadcast.

As a precaution, VOA has included plans for a backup system. If necessary, headquarters in Washington will use a telephone line to send programs to Bethany or Delano or a microwave circuit to transmit to Greenville. Overseas transmissions will be sent through dial-up telephone lines. Although it will lack the audio quality of SIS, this alternative will be available when needed.

VOA plans to expand the SIS network to include all of its relay stations to further improve its broadcast capabilities. Old circuits used in the past have been discarded as VOA relies on SIS technology. As relay stations broadcasting in reception areas are upgraded, listeners in Uganda and other parts of the world hear a clearer and more technically reliable Voice of America.

Voice of America

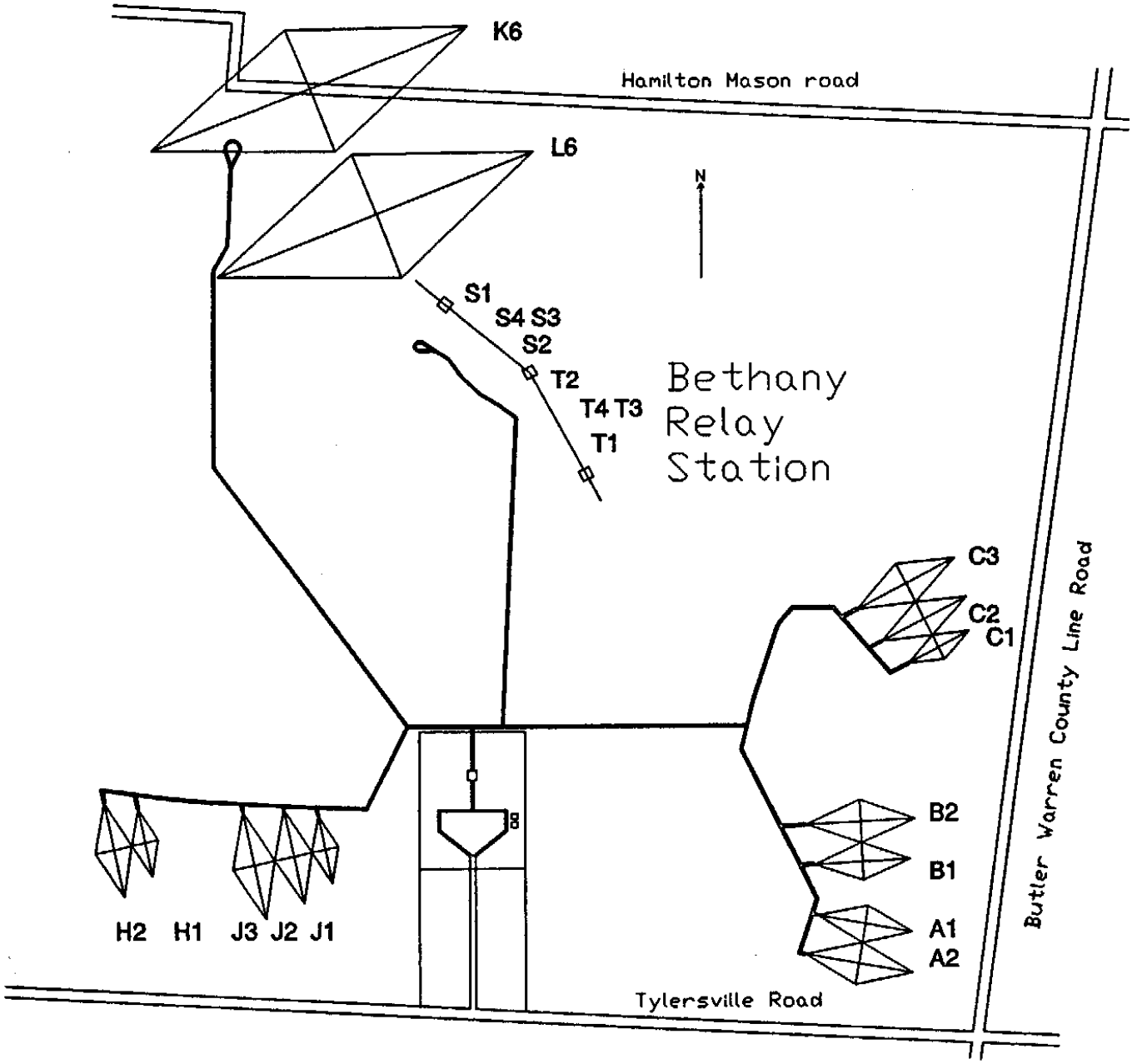
Washington, D.C. 20547

Revised July 25, 1994
Eastern Daylight Savings Time

BETHANY TRANSMITTER OPERATING SCHEDULE

TRANSMITTER	FREQUENCY	ANTENNA	LANGUAGE	TIME EDST
BY-1	11930 kHz	H2/168	R. MARTI	7:00 PM - 10:00 PM
BY-1	6055 kHz	H2/168	R. MARTI	10:00 PM - 12:00 MN
BY-1	6055 kHz	J3/168	R. MARTI	12:00 MN - 2:00 AM
BY-1	11815 kHz	H2/168	R. MARTI	8:00 AM - 10:00 AM
BY-2	17800 kHz	A1/100	ENGLISH	2:00 PM - 5:30 PM
BY-2	17800 kHz (Su-Fr)	A1/100	ENGLISH	5:30 PM - 6:00 PM
BY-3	6030 kHz (Mo-Fr)	J3/168	SPANISH	9:00 PM - 10:00 PM
BY-3	9530 kHz	A2/100	ENGLISH	2:00 AM - 2:30 AM
BY-3	9530 kHz (Sa-Su)	A2/100	ENGLISH	2:30 AM - 3:00 AM
BY-4	9775 kHz	J2/168	ENGLISH	8:00 PM - 10:00 PM
BY-4	9775 kHz (Mo-Fr)	J2/168	ENGLISH	10:00 PM - 10:30 PM
BY-4	7405 kHz	L6/66	ENGLISH	11:00 PM - 2:30 AM
BY-4	7405 kHz (Sa-Su)	L6/66	ENGLISH	2:30 AM - 3:00 AM
BY-4	5975 kHz (Mo-Fr)	J3/168	BBC SPAN	7:00 AM - 7:30 AM
BY-4	9600 kHz	J3/168	R. MARTI	8:00 AM - 10:00 AM
BY-5	11730 kHz (Mo-Fr)	J1/168	OAS ENGL	6:45 PM - 7:00 PM
BY-5	11730 kHz	J1/168	OAS SPAN	7:30 PM - 8:00 PM
BY-5	11730 kHz (Sa-Su)	J1/168	OAS PORT	8:00 PM - 8:30 PM
BY-5	13740 kHz (Mo-Fr)	J1/168	SPANISH	9:00 PM - 10:00 PM
BY-5	9670 kHz (Mo-Fr)	H1/168	BBC SPAN	7:00 AM - 7:30 AM
BY-6	9575 kHz	T1/74	ENGLISH	11:00 PM - 1:00 AM
BY-6	9665 kHz	T1/74	ENGLISH	1:00 AM - 2:30 AM
BY-6	9665 kHz (Sa-Su)	T1/74	ENGLISH	2:30 AM - 3:00 AM
BY-6	7405 kHz	J2/168	ENGLISH	6:00 AM - 8:00 AM
BY-6	15315 kHz (Mo-Fr)	H1/168	BBC SPAN	9:00 AM - 9:30 AM

Voice of America
Washington, D.C. 20547



Voice of America
Washington, D.C. 20547

Voice of America
Bethany Facilities

TRANSMITTERS	Manufacturer	Power	Frequency Range
BY-1, BY-2, BY-3	Asea Brown Boveri SK53-C3	250 kW	6-22 MHz
BY-4, BY-5, BY-6	Collins Radio 821A-1	250 kW	6-26.5 MHz
BY-9, BY-10	Continental 617-A	50 kW PEP	2-30 MHz

ANTENNAS

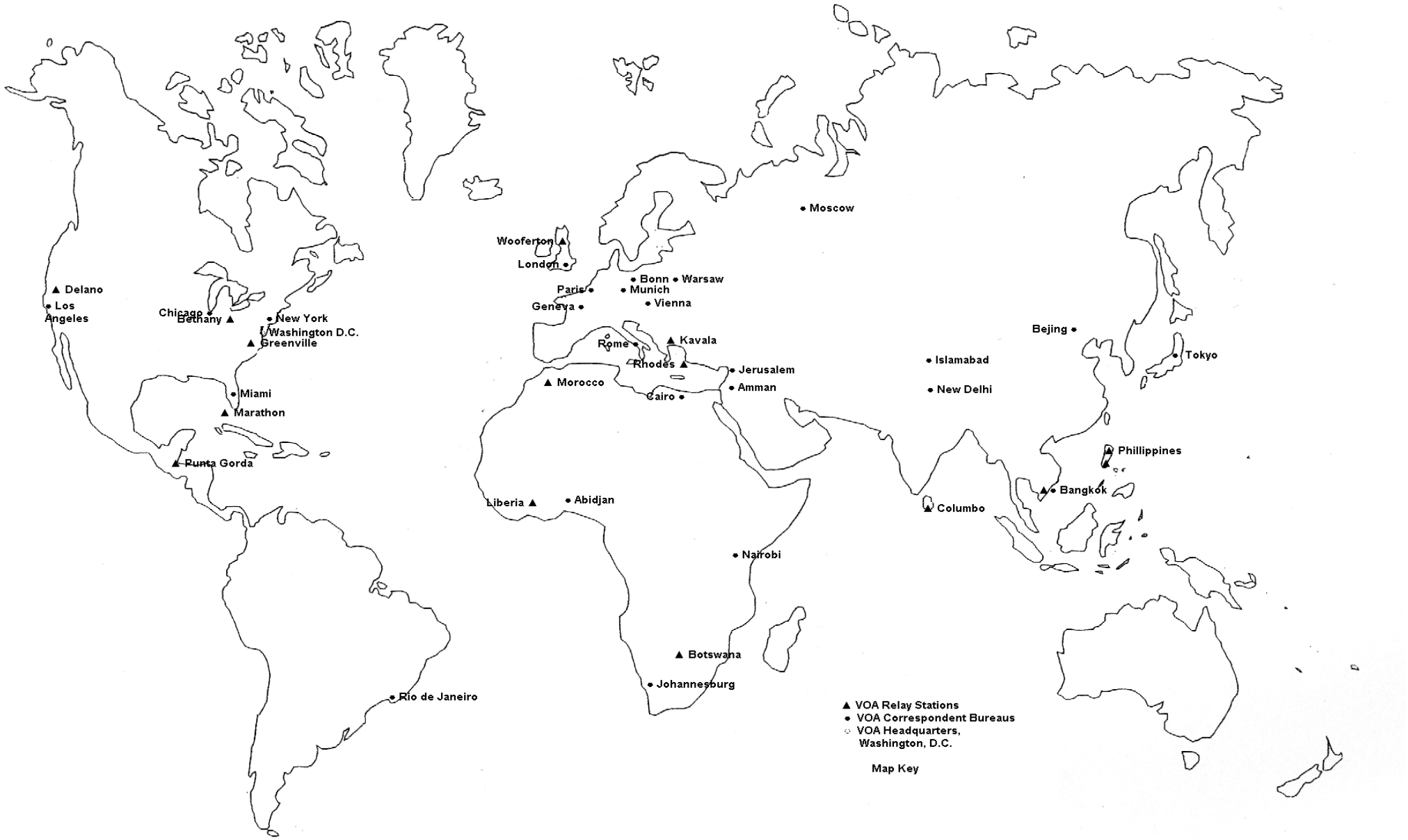
Curtain Antennas 250 kW	Beam Center	Area Covered
S1, S2, S3, S4	57.5 Degrees	Southern Europe, North Africa
T1, T2, T3, T4	74.5 Degrees	West and Central Africa
Rhombic Antennas 250 kW		
A1, A2	100 Degrees	South Africa
B1, B2	87 Degrees	West and Central Africa
C1, C2, C3	62 Degrees	Spain and North Africa
H1, H2, J1, J2, J3	168 Degrees	Caribbean and South America
K6, L6	66 Degrees	Spain and North Africa
K6, L6 (Reversed)	246 Degrees	North Mexico, New Zealand

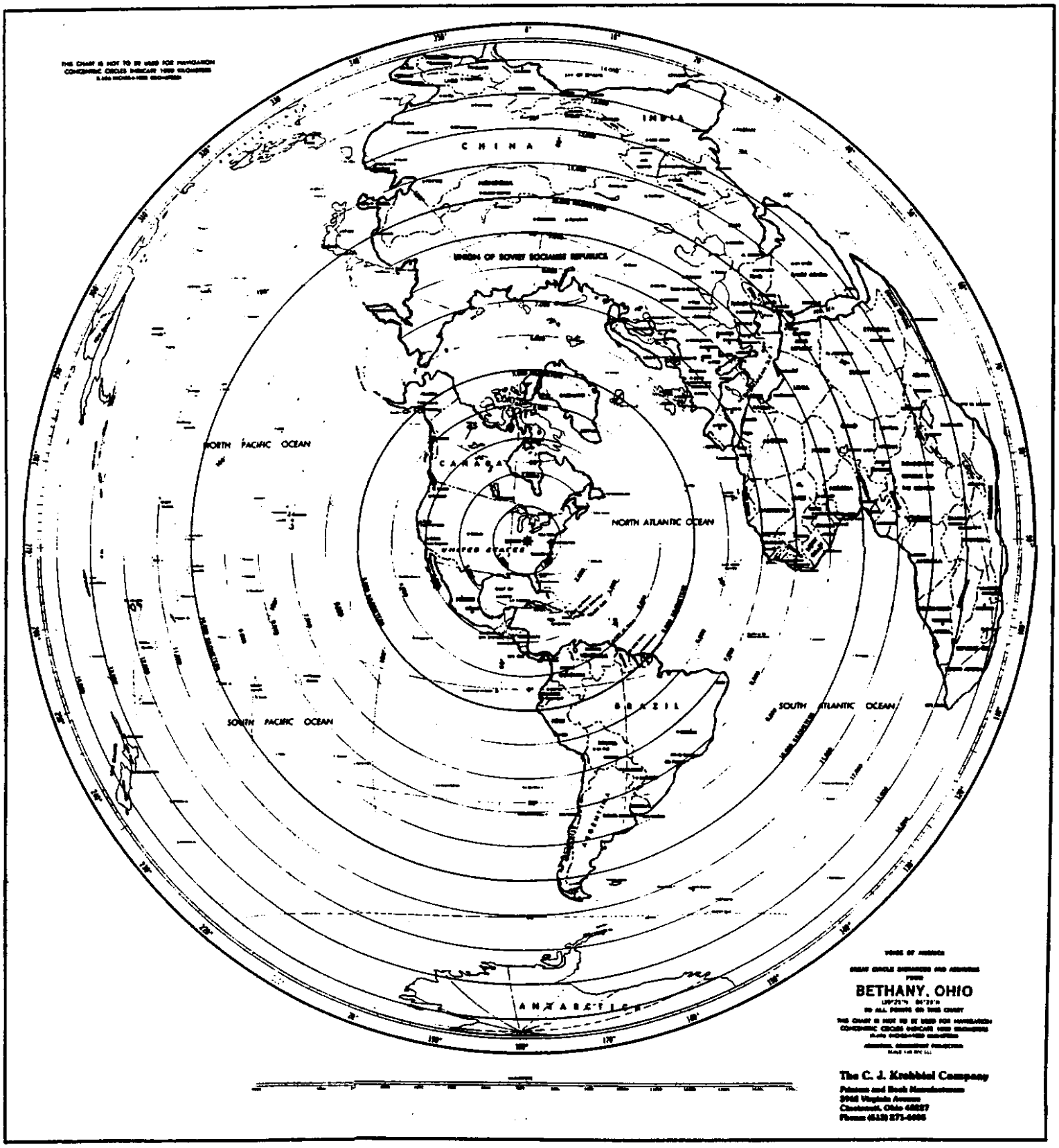
Antenna Switching Matrix - Any broadcast transmitter to any antenna.
- BY-9 connected to Antenna C1 only
- BT-10 connected to Antenna A2 only

Audio Switching - 12 program channels, plus test tone, plus cartridge tape machines to any transmitter via 3M computer-controlled audio matrix switch

Satellite Interconnect - 12 program channels from Washington Studios

A Global View




INDIA
CHINA
UNION OF SOVIET SOCIALIST REPUBLICS
NORTH PACIFIC OCEAN
CANADA
NORTH ATLANTIC OCEAN
UNITED STATES
BRAZIL
SOUTH ATLANTIC OCEAN
SOUTH PACIFIC OCEAN
ANTARCTICA
BETHANY, OHIO
The C. J. Krehbiel Company