STATEMENT OF CLAY T. WHITEHEAD

AT

50TH ANNIVERSARY DINNER

OF THE

INTERDEPARTMENT RADIO ADVISORY COMMITTEE

JUNE 22, 1972

THE STORY GOES THAT NEAR THE TURN OF THE LAST CENTURY A HIGH OFFICIAL IN THE PATENT OFFICE HAD RELUCTANTLY COME TO THE CONCLUSION THAT NOTHING ELSE COULD BE INVENTED. HE WROTE A MEMORANDUM IN WHICH HE RECOMMENDED THAT THE OFFICE BE CLOSED. YET THE PERIOD BETWEEN 1880 AND 1905 PROVED TO BE RICH IN NEW DISCOVERIES.

IN THE EARLY 1880'S, HEINRICH HERTZ WAS EXPERIMENTALLY INVESTIGATING THE NATURE OF ELECTROMAGNETIC WAVES. IN THESE EXPERIMENTS HE DEVELOPED AN OSCILLATOR FOR GENERATING HIGH FREQUENCY ELECTROMAGNETIC ENERGY. ESSENTIALLY, THIS OSCILLATOR WAS THE FIRST RADIO TRANSMITTER. AS TODAY, HOWEVER, A USABLE COMMUNICATION SYSTEM REQUIRED A RECEIVER, SO HERTZ IN DEVELOPING A DETECTOR WAS ABLE TO DETECT TRANSMISSIONS AT DISTANCES UP TO 25 FEET BY OBSERVING THE SPARK ACROSS ITS GAP.

ON DECEMBER 28, 1895, TWO BROTHERS IN PARIS PROJECTED THE FIRST MOTION PICTURE FILM; AT ITS FIRST SHOWING ONLY A HANDFUL OF PEOPLE WATCHED THE ARRIVAL OF A TRAIN AND A GARDNER GETTING WET. THIS WAS THE BEGINNING OF THE CINEMA. IN GERMANY, A PROFESSOR OF PHYSICS, W. C. ROENTGEN, PUBLISHED A PAPER IN 1895 ON X-RAYS. IN 1896, HENRY BECQUEREL, PROFESSOR OF PHYSICS IN THE POLYTECHNIC SCHOOL IN PARIS, DISCOVERED THAT URANIUM EMITTED ANOTHER KIND OF RAY. THUS A WHOLE NEW SCIENCE BEGAN. ACROSS THE ATLANTIC OCEAN IN NORTH CAROLINA, ORVILLE WRIGHT CLIMBED INTO THE PILOT'S POSITION OF HIS FLYER ON DECEMBER 17, 1903. HE WAS IN THE AIR FOR 12 SECONDS AND

FOR LONG DISTANCE COMMUNICATIONS FROM COAST STATIONS, AND THE RANGE BETWEEN 188-500 kHz WAS RESERVED FOR "SERVICES NOT OPEN TO PUBLIC CORRESPONDENCE, I.E., MILITARY AND NAVAL STATIONS." THE RHYTHMIC DISTRESS SIGNAL, SOS, STILL IN EXISTENCE TODAY, WAS ALSO ADOPTED AT THAT CONFERENCE.

THE RADIO ACT OF 1912, WHICH IMPLEMENTED THE AGREEMENTS MADE IN BERLIN IN 1903 AND 1906, PROVIDED FOR AN EXCLUSION FOR GOVERNMENT RADIO STATIONS AND GRANTED POWERS TO THE PRESIDENT FOR USE IN AN EMERGENCY. THE WIRELESS ACT OF 1919 WHICH WAS THE FIRST U.S. FEDERAL STATUTE CONTROLLING RADIO COMMUNICATIONS MADE IT MANDATORY THAT SHIPS CARRYING 50 OR MORE PASSENGERS BE EQUIPPED WITH RADIO.

BY 1922, THE PROLIFERATION OF RADIO OPERATIONS EXCEEDED THE THEN AVAILABLE SPECTRUM AND RUMORS OF "CHAOS AND CONFUSION" WERE RAMPANT. THE FIRST NATIONAL RADIO CONFERENCE, COMPRISING BOTH GOVERNMENT AND INDUSTRY REPRESENTATIVES, WAS HELD IN WASHINGTON IN 1922 TO DISCUSS REGULATION AND CONTROL OF THE FAST GROWING RADIO SERVICES. ON JUNE 1, 1922, A SPECIAL GOVERNMENT RADIO COMMITTEE HELD ITS FIRST MEETING ATTENDED BY REPRESENTATIVES OF AGRICULTURE, COMMERCE, NAVY, POST OFFICE, STATE, TREASURY, WAR, AND THE OFFICE OF THE CHIEF COORDINATOR. THIS WAS THE INTERDEPARTMENT RADIO ADVISORY COMMITTEE. AT ITS FIRST MEETING, THE COMMITTEE AGREED THAT INTERIOR, JUSTICE, LABOR, AND THE SHIPPING BOARD SHOULD BE ASKED TO JOIN.

I THINK IT IS INTERESTING TO NOTE THAT THE IRAC ORIGINATED NOT AS THE RESULT OF ACTION BY EITHER THE EXECUTIVE OR

COVERED A DISTANCE OF 40 METERS. ONLY FIVE PEOPLE WATCHED THE KITTY HAWK EXPERIMENT, BUT OF COURSE THERE WAS VERY LITTLE PUBLIC INTEREST IN FLYING AT THE TIME.

ON DECEMBER 12, 1901, ANOTHER MOMENTUS EVENT TOOK PLACE IN AN UNUSED BARRACKS HOSPITAL AT SAINT JOHNS, NEWFOUNDLAND. MARCONI AND HIS ASSISTANT HEARD THE THREE DOTS OF THE MORSE CODE LETTER "S"; SIGNALS ACROSS THE ATLANTIC OCEAN BY WIRELESS TELEGRAPHY ON 328 kHz FROM POLDHU IN CORNWALL, ENGLAND. THOSE WERE TRULY EXCITING TIMES--BECAUSE A FEW INDIVIDUALS "TRIED A LITTLE HARDER."

IN 1903, THE UNITED STATES AND EIGHT OTHER COUNTRIES MET IN BERLIN TO CONDUCT PRELIMINARY STUDIES FOR THE INTERNATIONAL REGULATION OF RADIO. IN ITS FINAL PROTOCOL, IT WAS DETERMINED THAT "COAST STATIONS SHALL BE BOUND TO RECEIVE AND TRANSMIT TELEGRAMS ORIGINATING FROM OR DESTINED FOR SHIPS AT SEA WITHOUT DISTINCTION AS TO THE SYSTEM OF RADIO USED BY THE LATTER." THIS PRINCIPLE BECAME THE BASIS FOR THE INTERNATIONAL REGULATION OF RADIO COMMUNICATIONS. BY THE TIME OF THE FIRST RADIO CONFERENCE IN BERLIN IN 1906, A COMPLETE DRAFT CONVENTION AND RADIO REGULATIONS HAD BEEN CONSIDERED BY THE TWENTY-NINE ATTENDING NATIONS. A SIGNIFICANT PART OF THIS CONFERENCE, AND OF ALL SUBSEQUENT RADIO CONFERENCES, WAS THE TREATMENT OF TECHNICAL QUESTIONS, PARTICULARLY THOSE OF FREQUENCY ALLOCATIONS. TWO WAVELENGTHS FOR PUBLIC CORRESPONDENCE AND MARITIME SERVICES WERE ESTABLISHED IN THE RADIO REGULATIONS AT 500 AND 1000 kHz; FREQUENCIES BELOW 188 kHz WERE RESERVED

LEGISLATIVE BRANCHES OF THE GOVERNMENT, BUT SPONTANEOUSLY THROUGH THE DEMAND OF THE INTERESTED GOVERNMENT AGENCIES.

SINCE ITS FOUNDING, THE COMMITTEE HAS ADVISED AND REPORTED DIRECTLY TO THE PRESIDENT OR HIS DESIGNATED REPRESENTATIVE ON SPECTRUM MATTERS. TODAY, THE COMMITTEE REPORTS TO ME AS DIRECTOR, TELECOMMUNICATIONS POLICY.

THE RECORDS OF IRAC ARE REPLETE WITH ACCOMPLISHMENTS. WHILE TIME DOES NOT PERMIT ME TO DWELL ON ALL OF THE ACHIEVEMENTS, I WOULD LIKE TO HIGHLIGHT A FEW AREAS. IRAC HAS SERVED AS A PRIMARY FORCE IN THE DEVELOPMENT OF U.S. POSITIONS FOR INTERNATIONAL CONFERENCES, SUCH AS THE ATLANTIC CITY CONFERENCE OF 1947, WHICH LAID DOWN THE FOUNDATION FOR POST-WAR COMMUNICATIONS; THE MAJOR WORLD ADMINISTRATIVE RADIO CONFERENCE OF 1959, WHICH PROVIDED FOR THE ACCOMMODATION OF NEW ELECTRONIC DEVICES SUCH AS IMPROVED RADIO NAVIGATION AND RADAR SYSTEMS; AND THE TWO MILESTONE SPACE CONFERENCES OF 1963 AND 1971. IRAC WAS DEEPLY INVOLVED IN EXPANSION AND ALLOCATION OF THE SPECTRUM; ABOVE 30 MHZ IMMEDIATELY FOLLOWING THE WAR, TO 40 GHZ IN 1959, AND FURTHER EXPANSION TO 275 GHZ IN 1971. THE COMMITTEE HAS BEEN INVOLVED IN NEARLY ALL DECISIONS RELATING TO THE USE OF THE SPECTRUM. THESE INCLUDE: THE GROWTH OF AVIATION NEEDS; EXPANDED POST-WAR DEFENSE REQUIREMENTS; COORDINATION WITH THE FEDERAL COMMUNICATIONS COMMISSION ON THE ALLOCATION OF SPECTRUM SPACE FOR FM AND TV BROADCASTING; AND SUPPORT OF NASA IN THE SPACE PROGRAMS. MORE RECENT ACTIVITIES INCLUDE: MEASURES TO

IMPLEMENT THE RESULTS OF THE 1971 WORLD ADMINISTRATIVE RADIO CONFERENCE ON SPACE TELECOMMUNICATIONS; PLANS FOR THE 1974 MARITIME CONFERENCE; AND A CONTINUOUS REVIEW OF ALLOCATIONS TO INSURE THAT THE LIMITED SPECTRUM RESOURCES ARE USED IN THE BEST NATIONAL INTEREST.

THE ANNALS OF IRAC CONTAIN MANY FAMOUS NAMES IN RADIO. FOR EXAMPLE, I NOTE THAT DR. J. H. DELLINGER OF THE DEPARTMENT OF COMMERCE ATTENDED THE VERY FIRST MEETING OF THE COMMITTEE. DR. DELLINGER, A NOTED SCIENTIST, WAS ASSOCIATED WITH THE COMMITTEE FOR MANY YEARS AND WAS AN AVID ADVOCATE OF THE ADVANCEMENT OF RADIO. THE FAMOUS "DELLINGER AFFECT" IN RADIO WAVE PROPAGATION BEARS HIS NAME. I'VE ALSO NOTICED SUCH NAMES AS ADMIRAL S. C. HOOPER, THE FATHER OF NAVAL RADIO, AND GENERAL WESLEY T. GUEST OF THE DEPARTMENT OF THE ARMY. THE NAMES OF SEVERAL FCC COMMISSIONERS ALSO COME TO MIND, FOR EXAMPLE, T. A. M. CRAVEN, JOHN CROSS AND E. K. JETT. I ALSO MUST RECOGNIZE GERALD GROSS, WHO WAS SECRETARY OF THE COMMITTEE FOR MANY YEARS AND ULTIMATELY BECAME SECRETARY-GENERAL OF THE ITU.

IN REVIEWING THE HISTORY OF IRAC, IT IS SAFE TO SAY THAT THE COMMITTEE'S GREATEST CONTRIBUTION HAS BEEN ITS COOPERATION AND VOLUNTARY DESIRE TO DO A GOOD JOB IN MANAGING AN IMPORTANT RESOURCE IN THE BEST INTEREST OF THE NATION. IT IS TESTIMONY TO THE ABILITY OF ORGANIZATIONS SUCH AS IRAC THAT THE RADIO SPECTRUM, SOMETIMES CALLED THE SIXTH NATURAL RESOURCE, HAS BEEN USED IN THE UNITED STATES IN A UNIQUE MANNER WHEN COMPARED

TO THE OTHER RESOURCES: LAND, WATER, MINERALS, FOREST, AND ENERGY, WHEREIN EXTENSIVE EFFORTS ARE NOW BEING EXPENDED TO RECTIFY PAST ERRORS REGARDING THEIR CONSERVATION, PROTECTION, DEVELOPMENT AND SYSTEMATIC USE.

ONE MIGHT OBSERVE TODAY, AS DID OUR PREDECESSORS IN 1912, THAT THE SPECTRUM IS COMPLETELY SATURATED AND THAT WE CAN LOOK FORWARD TO CONFUSION AND CHAOS. HOWEVER, I SUBMIT THAT WE ONLY HAVE SCRATCHED THE SURFACE OF OUR KNOWLEDGE ABOUT ~~AND~~ THE USE OF THE ELECTROMAGNETIC SPECTRUM. WITH MAN'S EXPLORATION OF THE MOON AND OUTER SPACE, I FORESEE THAT ONE CONSEQUENCE MIGHT BE THE ACCUMULATION OF DATA REVEALING THE NATURE OF GRAVITATION. THIS COULD PERMIT THE FORMULATION OF THE UNIFIED FIELD THEORY THUS FAR SOUGHT IN VAIN. IT WOULD BE A STEP IN THE UNDERSTANDING OF THE UNIVERSE COMPARABLE WITH, AND POSSIBLY SURPASSING, THE GREAT ADVANCES OF MAXWELL'S THEORY OF ELECTROMAGNETIC WAVES AND EINSTEIN'S THEORY OF RELATIVITY. THE ABILITY TO RECEIVE ELECTROMAGNETIC RADIATIONS OVER THE WHOLE OF THE SPECTRUM IN CONTRAST WITH THE NARROW SPECTRUM RANGES RECEIVABLE THROUGH THE EARTH'S ATMOSPHERE WOULD HAVE PROFOUND CONSEQUENCES. PERMITTING OUR MINDS TO RUN FREELY WE CAN FORESEE TREMENDOUS ADVANCES AS WE PROBE THE ENTIRE SPECTRUM AS A MEANS OF EXPANDING MAN'S KNOWLEDGE.

THE SPECTRUM IS NO LONGER A RESOURCE WHICH CAN BE TREATED ON THE BASIS OF A 3 BY 5 CARD RECORD SYSTEM. THERE HAS BEEN

AN INCREASING AWARENESS THROUGHOUT THE TOP LEVELS OF GOVERNMENT, THE CONGRESS, AND THE INDUSTRY THAT INCREASED ATTENTION MUST BE GIVEN TO THE CONSERVATION AND EFFICIENT USE OF THE FREQUENCY RESOURCE. THE IMPORTANCE OF THE SPECTRUM MAY BE RECOGNIZED IN THE STATEMENT OF ADMIRAL THOMAS H. MOORER, CHAIRMAN OF THE JOINT CHIEFS OF STAFF, THAT IF THERE WERE A WORLD WAR III, THE WINNER WOULD BE "THE SIDE THAT COULD BEST CONTROL AND MANAGE THE ELECTROMAGNETIC SPECTRUM."

AS I LOOK AHEAD INTO THE FUTURE, I SEE ONE NEED ABOVE ALL OTHERS--TO BE CONSTANTLY STRIVING TO ENSURE THAT THE SPECTRUM IS USED IN THE BEST COMMON GOOD. IN SHORT, THE GOAL MUST BE TO RECYCLE THE CYCLE ON A CONTINUOUS BASIS. TO ACHIEVE THIS GOAL, FOUR MAJOR OBJECTIVES MUST BE MET. FIRST, BETTER ENGINEERING IS NEEDED. THE COMPLEX PROBLEMS ASSOCIATED WITH THE SHOEHORNING IN OF NEW OVER-THE-AIR COMMUNICATIONS-ELECTRONICS APPLICATIONS CAN BE RESOLVED ONLY ON THE BASIS OF INCREASED EXPERTISE IN THE FIELDS OF FREQUENCY ASSIGNMENT AND ALLOCATION, ELECTROMAGNETIC COMPATIBILITY ANALYSIS, AND POTENTIAL BIOLOGICAL HAZARDS. HOWEVER, ENGINEERING ALONE IS NOT ENOUGH, AND THE SECOND OF OUR OBJECTIVES IS TO TAKE SOCIAL VALUES INTO ACCOUNT MORE EFFECTIVELY IN THE USE OF THE SPECTRUM. THIRD, AND CLOSELY AKIN TO THE SECOND OBJECTIVE, IS THE APPLICATION OF ECONOMIC FACTORS IN USE OF THE RESOURCE. THIS IS

PARTICULARLY IMPORTANT IN DETERMINING ALTERNATIVES TO SPECTRUM USE. AND LAST, A MORE ACUTE AWARENESS IS REQUIRED OF THE COMPLEXITIES AND CHANGING NATURE OF INTERNATIONAL AFFAIRS BEFORE WHICH SPECTRUM USAGE IS EXERCISED.

THESE OBJECTIVES CAN BE ACHIEVED ONLY IF POSITIVE MEASURES ARE TAKEN NOW WITH AN EYE TOWARD THE FUTURE. SPECIFICALLY, WE NEED YOUNG, HIGHLY QUALIFIED MEN OF VARYING DISCIPLINES TO BE INTRODUCED INTO THE PIPELINE. THE DEMAND FOR EXPERTISE IS EXCEEDING OUR CAPABILITY SUPPLY. FOR EXAMPLE, I AM DEEPLY IMPRESSED WITH THE IMPORTANCE AND POTENTIAL OF SPACE TELECOMMUNICATIONS AND THE NEED FOR THE UNITED STATES TO PLAY AN INCREASINGLY IMPORTANT ROLE IN THIS AREA. IN THIS REGARD, I AM CONCERNED THAT THERE WILL NOT BE A SUFFICIENT INPUT OF CAPABLE PERSONNEL WITHIN THE GOVERNMENT IN THE EARLY 70'S TO MEET THE NEGOTIATING DEMANDS OF FUTURE INTERNATIONAL CONFERENCES. WE MUST HAVE QUALIFIED SPOKESMEN "ON THE FIRING LINE" UNLESS WE ARE PREPARED TO BE LESS SUCCESSFUL IN FUTURE DELIBERATIONS OF THE TYPE RECENTLY UNDERTAKEN AT THE 1971 WORLD ADMINISTRATIVE RADIO CONFERENCE ON SPACE TELECOMMUNICATIONS. WE NEED CONTINUED AND IMPROVED COORDINATION BETWEEN GOVERNMENT AND INDUSTRY IN DEVELOPING OUR PLANNING AND INTERNATIONAL NEGOTIATIONS WITH RESPECT TO USE OF THE SPECTRUM. THIS IS PARTICULARLY POIGNANT IN LIGHT OF THE GROWING NUMBER OF ADMINISTRATIONS JOINING THE INTERNATIONAL FORUM.

HEINRICH HERTZ ONCE SAID, "THESE ARE THE ULTIMATE PROBLEMS OF PHYSICAL SCIENCE, THE ICY SUMMITS OF ITS LOFTIEST RANGE. SHALL WE EVER BE PERMITTED TO SET FOOT UPON ONE OF THESE SUMMITS, WE KNOW NOT; BUT WE HAVE FOUND A STARTING POINT FOR FURTHER ATTEMPTS WHICH IS A STAGE HIGHER THAN ANY USED BEFORE."

IN ITS 50 YEARS, THE IRAC HAS FACED AND MET THE MANY CHALLENGES ENGENDERED BY TECHNOLOGICAL ADVANCES. HOWEVER WELL DONE THE TASK HAS BEEN, NOW IS NOT THE TIME TO REST ON OUR LAURELS. NEW CHALLENGES TO MEET FUTURE COMMUNICATION-ELECTRONICS NEEDS ARE BEFORE US. THE NEW DIMENSION PROVIDED BY THE "SPACE AGE" HAS ADDED ZEST TO THE SEARCH FOR IMAGINATIVE SOLUTIONS. IN THESE DAYS OF SOCIAL CHANGE, COMMUNICATIONS-ELECTRONICS HAS MUCH TO OFFER IN THE CATEGORY OF "DOING THINGS FOR PEOPLE"--THAT IS, CONTRIBUTING TO MAKING A BETTER WORLD IN WHICH TO LIVE.

WITH THE BENEFIT OF THE ADVICE FROM THE CURRENT AND FUTURE IRAC MEMBERSHIP, I LOOK FORWARD TO THESE CHALLENGES WITH A SECURE FEELING THAT THE SPECTRUM AREA WILL BE WELL HANDLED.

MAR 3 1972

MEMORANDUM FOR

Miss Eliska Hasek
The White House

I am attaching two alternate messages for the President to send to the Interdepartment Radio Advisory Committee (IRAC) on the occasion of its Fiftieth Anniversary. In addition, the text of a booklet to be published in commemoration of the occasion is included. If approved, the President's message will be published as the first page of this booklet.

The IRAC was established on June 1, 1922, by Herbert Hoover, who was then Secretary of Commerce, to provide him advice on radio spectrum matters. In 1934, Congress assigned responsibility for radio spectrum usage by the Federal Government to the President of the United States. This responsibility is vital to the support of communications and electronics activities of the Government, and consequently, each President since 1934 has retained the IRAC to advise him on radio spectrum matters. IRAC members are engineers, scientists, military officers, and administrators, many of whom have achieved distinction in their fields.

Ceremonies to commemorate the Fiftieth Anniversary of IRAC will be held in June. A message from the President would highlight the occasion and call attention to the consistent and valuable work IRAC has done and is doing.

Linda K. Smith
Special Assistant
to the Director

Attachments

cc: DO Chron
DO Records
Whitehead (2)
Mansur
FMD
EVA
LKS Subject
LKS Chron
LKSmith:jem

SUGGESTED MESSAGE FOR THE PRESIDENT
TO SEND TO THE INTERDEPARTMENT RADIO ADVISORY COMMITTEE (IRAC)
ON THE OCCASION OF ITS FIFTIETH ANNIVERSARY

I am pleased to extend greetings and congratulations to the members, past and present, of the Interdepartment Radio Advisory Committee (IRAC) on the occasion of its Fiftieth Anniversary.

When your Committee was established in 1922, radio was in its infancy. Modern communications technology was unheard of: satellites, radars, television, and terrestrial microwave networks are now commonplace. Application of communications and electronics technology in lunar and outer space exploration was beyond the imagination. Radio continues to be a valuable component of the new array of communications techniques. In fact, its use has increased, as has the importance of the IRAC's advice on the use of the radio spectrum by the Federal Government.

Communications plays an essential role in the effective conduct of business, government, and in our personal lives. Fulfilling my responsibilities in the communications area, depends in part on the effective management of our radio frequency resources. For this reason, when my 1970 communications reorganization plan was implemented, setting up the Office of Telecommunications Policy, care was taken to preserve access to the advice of your Committee.

In our open and democratic society, the freedom to communicate, whether through television and radio broadcasting, radiotelephones, or other means, has become a part of our heritage. The conduct of national and international affairs of Government in this modern age illustrates the importance of rapid and responsive communications. A common denominator to all of this is the Government's free access to the radio spectrum of which your Committee has been a custodian for so many years.

Evidence of the outstanding work accomplished in the IRAC is attested to by the sophisticated communications and electronics capabilities of our country. I have no doubt that the same inspiration that brought the IRAC through fifty years of challenging tasks will result in an even more outstanding future in serving our great nation.

SUGGESTED MESSAGE FOR THE PRESIDENT
TO SEND TO THE INTERDEPARTMENT RADIO ADVISORY COMMITTEE
(IRAC) ON THE OCCASION OF ITS FIFTIETH ANNIVERSARY

I am pleased to extend greetings and warmest congratulations to the Interdepartment Radio Advisory Committee on its Fiftieth Anniversary.

When your Committee was first established in 1922, radio was in its infancy. Since that time technological development in communications has soared and accordingly so has the importance of the work of IRAC in advising on the use of the radio spectrum by the Federal Government. The efficient conduct of our Government's national and international affairs is to a large degree dependent on the effective management of our radio frequency resources. Our Government is indeed indebted to the IRAC for its outstanding work through the years in carrying out this task.

Best regards for continued success in the challenging years ahead.

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

May 26, 1972

To: MR. WHITEHEAD

From: Linda Smith

Subject: IRAC Anniversary Plans

Tab A - Mr. Whitehead's Dinner Speech

1. First 3 pages are history of radio. This should be 1/2 page at most.

2. Next 3 pages are IRAC history and personalities. Is too fawning. Should be shorter. Take out section on personalities (page 5).

3. Page 6 - Section on resources other than the spectrum is irrelevant.

4. No unifying direction or theme in next section (starting page 7). Should be on current problems of spectrum management, then on what you see as the future. Emphasis should be more on policy development and importance of co-ordination.

5. Basically, there is no meat here - it is a perfect chance to state your theory of spectrum management and it should be able to be done coherently in 5-7 pages.

Tab B - Commemorative Booklet for IRAC Dinner.

1. For future reference, this seal and logo should not be used. Also graphics should conform to latest cover for the Staff Research Reports. Betty will know whate the latest form is.

2. Incredibly dull, historic not enough policy orientation. Organized by decade. Tends to stress status guo.

3. Graphics are unbelievable. It is not jazzy enough to hand out at a banquet - but it is too late to change and it may work for this group.

Tab C - Press Release

1. It doesn't say much beyond that IRAC is 50.

2. I have revised it and a draft is attached.

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

May 22, 1972

To: Tom Whitehead

From: Will Dean

Subject: IRAC 50th Anniversary

By memoranda of October 22, January 7, and March 27, you were advised of planning on subject matter.

The current status of developments in this regard is as follows:

a. Article by Bill Plummer was included in the May issue of SIGNALS (AFCEA magazine). Another article, prepared by Leo Buss, will be included in a forthcoming issue of IEEE Spectrum magazine.

b. Plans are proceeding satisfactorily for the Anniversary Banquet at Bolling AFB Officers Open Mess on June 22. Invitations have been extended to a long list of senior individuals throughout the Government. A proposed text for your delivery at the banquet as Keynote Speaker is set forth in Tab A.

c. An historical document, including the Presidential statement of April 17, has been prepared as set forth in Tab B. Copies of this documentation will be handed out in commemorating the occasion the night of the Anniversary Dinner.

d. A proposed press release is set forth in Tab C. It is recommended that it be issued on or about June 1.

Will

W. Dean, Jr.

Attachments

cc: Brian Lamb
Linda Smith

A

3-522

OFFICE OF TELECOMMUNICATIONS POLICY

May 22, 1972 Log In No. ____

ACTION MEMORANDUM FOR TOM WHITEHEAD

Through:
From: Will Dean 5/22/72
Subject: IRAC 50th Anniversary

Co-ordinated with:

Staff Opinions: Attached report "raps up" preparatory work for subject event.

Action required by the Director: a) Review and revise Tab A.
b) Note Tab B.
c) Approve Tab C.

None _____
For your signature _____
Further discussion required with author _____
Further discussion required with staff _____
Which member of the staff _____
Approve attached draft _____
Approve recommended course of action (see below) _____
Other _____

Available options:

A. C.
B. D.

Recommended next steps (author's recommendation):

Director's comments:

Record of disposition and action taken.
Log out date _____ time _____
Referred to _____ (name of staff member)
Action requested _____
Due Date _____

Form OTP 10
January 1972

STATEMENT OF CLAY T. WHITEHEAD

AT

50TH ANNIVERSARY DINNER

OF THE

INTERDEPARTMENT RADIO ADVISORY COMMITTEE

JUNE 22, 1972

The story goes that near the turn of the last century a high official in the Patent Office had reluctantly come to the conclusion that all there was to be invented had been invented. He drew up a memorandum recommending the closure of the Office and his dismissal. Yet the very period between 1880 and 1905 was richer in new discoveries than most other eras.

In the early 1880's, Heinrich Hertz was experimentally investigating the nature of electromagnetic waves. In his experiments he developed an oscillator for generating high frequency electromagnetic energy. Essentially this oscillator was the first radio transmitter. As today, however, a usable communication system required a receiver, so Hertz developed a detector and was able to detect transmissions at distances up to 25 feet by observing the spark across its gap.

On December 28, 1895, two brothers in Paris projected the first motion picture film; on the first night only a handful of people watched the arrival of a train and a gardener getting wet. This was the beginning of the cinema. In Germany, a professor of physics, W. C. Roentgen, published a paper in 1895 on what came to be known as X-rays. In 1896, Henry Becquerel, Professor of Physics in the Polytechnic School in Paris, discovered that uranium gave off another kind of ray. Thus started a whole new science. Across the Atlantic Ocean in North Carolina, Orville Wright climbed into the pilot's position of his flyer at 10:35 a.m. local time on December 17, 1903; he was in the air for 12 seconds and covered a distance of 40 meters. Five people came to watch at Kitty Hawk, but there was very little public interest in flying for several years.

At 12:30 p.m. local time on December 12, 1901, another momentus event took place in an unused barracks hospital at Saint Johns, Newfoundland. The three dots of the Morse Code letter "S" were heard by Marconi and his assistant; signals across the Atlantic Ocean by wireless telegraphy on 328 kHz from Poldhu in Cornwall, England. Those were truly exciting times--because a few individuals "tried a little harder."

In 1903, the United States and eight other countries met in Berlin to conduct preliminary studies for the international regulation of radio. In the final protocol of this gathering, it was laid down that "coast stations shall be bound to receive and transmit telegrams originating from or destined for ships at sea without distinction as to the system of radio used by the latter." This principle became the basis for the international regulation of radio communications. By the time of the first Radio Conference in Berlin in 1906, a complete draft convention and radio regulations were considered by twenty-nine attending nations. A main work of this Conference, and of all subsequent radio conferences, was the treatment of technical questions, particularly those of frequency allocations. Two wavelengths for public correspondence and maritime services were established in the radio regulations at 500 and 1,000 kHz; frequencies below 188 kHz were reserved for long distance communications from coast stations, and the range between 188-500 kHz was reserved for "services not open to public correspondence, i.e. military and naval stations." The rhythmic distress signal still in being today, SOS, was also adopted at that Conference.

The Radio Act of 1912, which implemented on a national level the international agreements made in Berlin in 1903 and 1906, provided for an exclusion for Government radio stations and granted powers to the President for use in an emergency. The Wireless Act of 1919--the first U.S. Federal statute controlling radio communications--made it mandatory that ships carrying 50 or more passengers be equipped with radio.

By 1922, the proliferation of radio operations exceeded the then available spectrum and rumors of "chaos and confusion" were rampant. The first National Radio Conference, combining both Government and industry representatives, was held in Washington in 1922 to discuss regulation and control of the fast growing radio services and on June 1, 1922, a special Government radio committee held its first meeting with attendance by representatives of Agriculture, Commerce, Navy, Post Office, State, Treasury, War, and the Office of the Chief Coordinator. This was the Interdepartment Radio Advisory Committee, a body which has continued to the present. At the first meeting, the committee agreed that Interior, Justice, Labor, and the Shipping Board should be asked to join.

I think it is interesting to note that the IRAC came into being, not as the result of action by either the Executive or Legislative Branches of the Government, but spontaneously through the demand of the interested Government agencies.

Since its founding, the committee has advised and reported directly to the President or his designated representative on spectrum matters. Today, the committee reports to me as Director, Telecommunications Policy.

The records of IRAC are replete with accomplishments. Time does not permit one to dwell on achievements at length other than to note a few high points. The committee has served as a primary source in the development of U.S. positions for international conferences, notably the Atlantic City Conference of 1947, results of which were the foundation for post-war communications, the major World Administrative Radio Conference of 1959, which provided for the accommodation of new electronic devices such as improved radio navigation and radar systems, and the two milestone Space Conferences of 1963 and 1971. Thus, the IRAC was heavily involved in expansion and allocation of the spectrum above 30 MHz immediately following the war, to 40 GHz in 1959, and further expansion to 275 GHz in 1971. The committee was also in the thick of virtually all decisions bearing on the use of the spectrum, such as the growth of aviation needs, expanded post-war defense requirements, working with the Federal Communications Commission on the allocation of spectrum space for FM and TV broadcasting, and support of NASA in the space programs, to name a few. More recent activities include measures to implement the results of the 1971 World Administrative Radio Conference on Space Telecommunications, initiating planning for the 1974 Maritime Conference, and a continuous review of allocations to insure that the limited spectrum resources are used in the best national interest.

The annals of IRAC contain many famous names in radio. For example, I note that at the very first meeting of the Committee Dr. J. H. Dellinger of the Department of Commerce was in attendance. Dr. Dellinger, a noted

scientist, nationally and internationally, was associated with the committee for many years and was an avid advocate of the advancement of radio. The famous "Dellinger Affect" in radio wave propagation bears his name. I've also noticed such names as Admiral S. C. Hooper, the father of naval radio; General Wesley T. Guest of the Department of the Army; and Commodore E. M. Webster, the father of Coast Guard radio. The names of several FCC Commissioners also come to mind, for example, T. A. M. Craven, John Cross and E. K. Jett. I also must recognize Gerald Gross, who was Secretary of the Committee for many years and ultimately became Secretary-General of the ITU, as well as Paul Miles, a long time participant in IRAC and the first chairman of the International Frequency Registration Board. Two other names stand out in the history of the Committee. In 1943, Mr. S. L. Windes became the representative of the Department of Interior and has held that position to the present time--nearly 30 years of dedicated service. A good friend of mine and a former associate, Bill Plummer, served the committee as the chairman from 1954 to 1964, the longest period for anyone to hold that position.

In reviewing the history of the IRAC, it is safe to say that the Committee's greatest contribution has been its cooperation and voluntary desire to do a good job in managing an important resource in the best interest of the nation. It is testimony to the ability of organizations such as the IRAC that the radio spectrum, the sixth natural resource as it is sometimes called, has been used in the United States in a unique manner when compared to the other resources of land, water, minerals, forest, and energy, wherein extensive efforts are now being expended

to rectify past errors regarding their conservation, protection, development and systematic use.

With respect to our other resources, studies indicate that unless remedial steps are taken we will run out of such metals as chromium, nickel, tungsten, copper, lead, zinc, tin and silver in the foreseeable future. If we are to continue to take advantage of the use of available metal resources, it is obvious that we must begin to recycle our metals completely, and this as soon as possible.

The matter of our oil reserves is equally alarming. At present the world's use of oil is about 45 million barrels per day or about 16 billion barrels per year. The known reserves are estimated to be of the order of 600 billion barrels, or enough for 37 more years at the current rate of use--and consumption has been doubling every 8 years. Unless we convert to other sources of power, such as nuclear, in the immediate future, the future generation is literally going to run out of gas.

Returning to the frequency resource, one might say today, as did our predecessors in 1912, that the spectrum is completely saturated and we can only look forward to confusion and chaos. However, I submit that we have only scratched the surface as regards our knowledge about and use of the electromagnetic spectrum. With man's exploration of the Moon and outer space and our ability to explore and even visit many parts of the observable universe, I foresee that one consequence might

be the accumulation of data revealing the nature of gravitation. This could permit the formulation of the unified field theory which science has sought thus far in vain. It would be a step in the understanding of the universe comparable with, and possibly surpassing, the great advances of Maxwell's theory of electromagnetic waves and Einstein's theory of relativity. The ability to receive electromagnetic radiations over the whole of the spectrum in contrast with the narrow spectrum ranges receivable through the earth's atmosphere would have profound consequences. If one permits his mind to run freely we can foresee tremendous advances as we probe the entire spectrum as a means of expanding man's knowledge.

The spectrum is no longer, and has not been for some time, a resource which could be treated on the basis of a 3 by 5 card record system. There has been an increasing awareness throughout the top levels of Government, the Congress, and the industry that increased attention must be given to the conservation and efficient use of the frequency resource. Recognition of the importance of the spectrum at high levels may be gathered from the statement of Admiral Thomas H. Moorer, Chairman of the Joint Chiefs of Staff, that if there were a World War III, the winner would be "the side that could best control and manage the electromagnetic spectrum."

As I look ahead into the future, I see one need which stands out above all others as regards the spectrum--to be constantly striving to ensure that the resource is used in the best common good. In short,

the goal must be to recycle the cycle on a continuous basis. To attain this goal, four major objectives arise on which we should set our sights. First, there is an increased need for better engineering. The complex problems associated with the shoehorning in of new over-the-air communications-electronics applications can only be resolved on the basis of increased expertise in the fields of frequency assignment and allocation, electromagnetic compatibility analysis, and potential biological hazards. Engineering alone is not enough, and the second of our objectives should be to take into account more effectively social aspects in the use of the spectrum. Third, and closely akin to the second objective, I see the need for taking economic factors into account more thoroughly in our application and use of the resources. This is particularly important as regards the determination of alternatives to spectrum use. And last, we must be more acutely aware of the complexities and changing nature of the backdrop of international affairs before which spectrum usage must be exercised.

These objectives can only be achieved if positive measures are taken now looking to the future. Specifically, we need young, highly qualified men of varying disciplines to be introduced into the pipeline. A survey shows that the majority of our most competent experts in this particular field, so vital to the country, will be eligible for greener pastures in the immediate future.

The needs for expertise are increasing rapidly while our capabilities are not keeping pace. For example, I am deeply impressed with the importance and potential of space telecommunications and the

need for the United States to play an increasingly important role in this area. I am concerned, however, less our successors find that within the Government in the early 70's there was not a sufficient input of capable personnel to meet the negotiating demands of future international conferences. We must have qualified spokesmen "on the firing line" unless we are prepared to be less successful in future deliberations of the type recently undertaken at the 1971 World Administrative Radio Conference on Space Telecommunications. We need continued and improved coordination between Government and industry in developing our planning and international negotiations with respect to use of the spectrum. Our coordination mechanism with other nations must also be strong in this field and it is increasingly apparent that the ability of the United States to obtain its objectives in the international telecommunications forum will to a significant degree be directly proportional to the expertise which goes into preparation for and participation in international activities in the spectrum area. This point is very important in light of the ever growing number of administrations belonging to the international forum, each having one vote.

Heinrich Hertz once said,"These are the ultimate problems of physical science, the icy summits of its loftiest range. Shall we ever be permitted to set foot upon one of these summits, we know not; but we have found a starting point for further attempts which is a stage higher than any used before."

In its 50 years, the IRAC has faced the many challenges engendered by technological advances and met them well. However well done the task

has been, now is not the time to rest on our laurels. New challenges to meet the communication-electronics requests in the rest of this century are before us. The new dimension provided by the "space age" has added zest to the search for imaginative solutions. In these days of social change, communications-electronics has much to offer in the category of "doing things for people"--that is, contributing to making a better world for people to live in.

With the benefit of the advice from the current and future IRAC membership, and noting the superb track record of the past, I look to and invite these challenges with a secure feeling that the spectrum area will be well handled--even down to recycling the cycle with all this connotes in the process.

B

THE INTERDEPARTMENT RADIO ADVISORY COMMITTEE

FIFTY YEARS OF SERVICE

An Overview

On June 1, 1922, a United States Government interagency committee met for the first time. Its purpose was to find means for making the most effective use of the radio wavelengths then being used for Government broadcasting. Originally named the Interdepartment Advisory Committee on Governmental Radio Broadcasting, it soon recognized the need to consider other telecommunication matters of interest to the departments and, in 1923, changed its name to the Interdepartment Radio Advisory Committee. June 1, 1972 marks 50 years of continuous service by that Committee.

The Interdepartment Radio Advisory Committee, more commonly referred to as the IRAC, came into being spontaneously through a demand of the interested Government agencies and not as the result of action by either the Executive or Legislative branch of the Government. The IRAC is unique among Government committees because: it has continued to fill an essential need for fifty years; it has served to foster the development of both Government and non-Government views and positions; it has made it possible for the national security agencies to work freely and confidently with the other agencies, including the Federal Communications Commission; it has been alert to changing requirements resulting from advances in technology, new situations and new methods, and has facilitated realignment of spectrum use therefor; and, finally, it has confined its activities to its assigned mission. In the process, it has furnished a conspicuous example of voluntary self-regulation resulting from a realization of the necessity for cooperation and coordination in the common good.

The IRAC advised and reported directly to the President on frequency assignments to Government radio stations without portfolio until April 8, 1927, when President Calvin Coolidge, in a letter to Secretary of Commerce Herbert Hoover, affirmed the Committee action in assuming the responsibility on behalf of the President. From that time the IRAC has acted as a clearing house in the coordination and assignment of frequencies to radio facilities of the Government. Since 1927, by Presidential order, it has reported through or to: the Secretary of Commerce-1927; the Federal Communications Commission Chairman-1935; the Telecommunications Advisor to the President-1951; the Director, Office of Defense Mobilization and successor agencies-1953; the Director of Telecommunications Management-1962; and the Director of the Office of Telecommunications Policy-1970.

The state of the radio art during the 1920's, when the IRAC began to function, was characterized by novelty and future promises. Voice broadcasting, particularly to the public, was an intriguing experience stimulated by the public's first opportunity to eavesdrop on the proceedings of the U.S. political conventions. Radiocommunication services of that period were confined primarily to commercial communications companies who provided international point-to-point telegraph service and telegraph service with ships. The usable frequency spectrum was reaching upward into the twenty megahertz region. Particular areas of serious crowding were below 550 kHz and between 4 and 10 MHz. The high frequency region of the spectrum was still an exciting new territory in contrast to the longer wave region and its very cumbersome and expensive installations.

Stimulation by vast wartime expenditures for research and the general acceptance of entertainment broadcasting to the public, radically changed the radio art of the prewar period. Where in the 1920's a few hundred users and equipments in a very few services were involved, today every household has its electronic devices. The few commercial telegraphy services have evolved into a multiplicity of different applications of radio and radio services. Military efforts resulted in new concepts, complex systems and different services. High mobility and lightweight portability of equipment were emphasized, together with person-to-person voice communication, in contrast to telegraphy. Wide band multi-channel systems, radar and navigational aids as well as a variety of specialized devices emerged and the numbers of equipments spiraled. To provide for the demands of a host of would-be users thereof, in all areas of the government and civil economy, radio frequency managers were pressed to open up new regions of the radio spectrum and to relieve growing congestion by more intensive and more effective use of the limited usable spectrum area. The IRAC has had a leading role in bringing about these changes and augmenting radio frequency resources manyfold.

The following table portrays the growth of the usable spectrum with respect to International Radio Conferences:

Year	International Radio Conference	Spectrum Allocated (kHz)	
1906	Berlin	500 and	1,000
1912	London	150 to	1,000
1927	Washington	10 to	23,000
1932	Madrid	10 to	30,000
1938	Cairo	10 to	200,000
1947	Atlantic City	10 to	10,500,000
1959	Geneva	10 to	40,000,000
1963	Geneva (Space)	10 to	40,000,000
1967	Geneva (Maritime)	10 to	40,000,000
1971	Geneva (Space)	10 to	275,000,000

The 1906 Conference was concerned only with the maritime service -- radio-communication between ships and shore. The 1971 Conference, alone, added some fourteen new services to bring the total number of allocated services to more than thirty. In terms of assignments to Government radio stations, the number has grown from 600 in 1928, to 60,000 in 1954, and 120,000 in 1971. Applications for frequency assignment now average about 50,000 each year.

Under Reorganization Plan No. 1 of 1970 (effective April 20, 1970) and Executive Order No. 11556 of September 4, 1970, the functions relating to frequencies used by radio stations belonging to and operated by the United States, conferred upon the President by the provisions of section 305(a) of the Communications Act of 1934, were transferred to the Director of the Office of Telecommunications Policy.

The mission of the IRAC is to formulate and recommend to the Director objectives, policies, plans, and actions as appropriate in connection with the management and usage of the radio spectrum in the national interest by the departments and agencies of the U.S. Government. Subject to the Director's policy guidance and approval, the Committee coordinates the assignment of frequencies for Government radio station use. It plays a major role in preparation for international conferences and participation on delegations to such conferences. As regards the use of radio, the IRAC bears a similar relation to the Government departments as the Federal Communications Commission (FCC) to the non-Government interests. The Committee also assists and advises the Director and the various federal agencies on related technical radio problems of inter-agency interest, and on other questions as may be referred to the Committee from time to time by the Director.

The IRAC has a membership of sixteen departments or agencies, with liaison representation of the Federal Communications Commission. It has three permanent subcommittees: Frequency Assignment, Spectrum Planning, and Technical. The IRAC and its subcommittees are chaired by officials of the Office of Telecommunications Policy.

The 20's - A Start, and Recognition by the President

The First National Radio Conference, combining both Government and industry representatives, was held in Washington in 1922 to discuss regulation and control of the fast-growing radio services. This conference awakened several of the Government departments to the need for cooperative action in solving the problems arising from the Federal Government's interest in broadcasting, especially since the Navy Department had established broadcasting facilities at the Washington Navy Yard and made them available to other Government departments. It was proposed that a committee assist in regulating and guiding the operation of this station and any others that might be established by the Government. At the suggestion of Dr. S. W. Stratton, Chairman of the Conference, Secretary of Commerce Herbert Hoover, whose department regulated radio in those days, invited interested Government departments to designate representatives for a special Government radio committee. The respondents met on April 17, 1922 and recommended that a permanent interdepartment committee be formed. Their recommendation was approved and the first meeting of the new committee was held on June 1, 1922.

The first meeting had Dr. S. W. Stratton as chairman and Dr. J. H. Dellinger - who was to be continuously associated with the committee for many years - as secretary. Both were from the Department of Commerce. Other departments or agencies represented were: Agriculture, Navy, Post Office, State, Treasury, War and the Office of the Chief Coordinator (an office in the Bureau of the Budget). During that first meeting, the Committee agreed that its scope should be extended beyond broadcasting and that it should be advisory to the Secretary of Commerce in all matters of Government radio regulation. To broaden its membership, the Committee agreed that Interior, Justice, Labor and the Shipping Board would be asked to join.

At that meeting in June 1922, representatives of Agriculture and Navy reported on a mutual agreement on the scheduling of broadcasting crop and market news from the Arlington and Great Lakes stations via radio telegraphy. These two stations of the Navy, plus six stations of the Post Office, constituted the primary broadcasting system of the Government. The Committee took note of the excessive speed of some of the broadcast operators, then using radiotelegraph, and decided they should be cautioned not to exceed 15 words per minute. The possibility of broadcasting the Marine Band Concerts by radiotelephone to the public parks in Washington, D. C., on 412 meters, was also considered, but subsequently found to be impractical.

Representative matters coming under consideration by the Committee that first year were: (1) the replacement of arc transmitters by vacuum tube transmitters due to the broad interference characteristics of the former; (2) preparation for the Second National Radio Conference; and (3) preparation for a possible Pan American radio conference. In 1923, Rules for the Organization and Procedure of the IRAC were adopted. It is interesting to note that these rules provided for subcommittees on Broadcasting, Technical Problems, Operation Policy and Legislation, and Mobile Radio. These rules were followed until replaced by Bylaws in 1941, which provided for the parent Committee and a Technical Subcommittee.

On May 8, 1925, the IRAC adopted a comprehensive statement of Government Domestic Radio Policy applicable to the times. Among other things, it recognized the importance of radiocommunication to national defense, the necessity for coordination among Government departments, and the prerogative of each Executive Department to be the sole and final judge as to its own policy in respect of radio matters, subject to limitations stated therein and to such instructions as may be issued by the President.

On February 27, 1927, the Radio Act of 1927 created a five-member Federal Radio Commission (FRC) to regulate certain aspects of non-Government radio, including the allocation of bands of frequencies to radio services, assignment of specific power, and issuance of station licenses. The Act assigned to the Secretary of Commerce authority to assign call signs, inspect radio stations, and examine and license radio operators, but reserved to the President the assignment of frequencies to all Government radio stations. Although it was intended that one year after the first meeting of the FRC most of its powers and authority were to be vested in and exercised by the Secretary of Commerce, the FRC was continued until June 1934 when it was supplanted by the FCC.

The role of the IRAC as an advisory body to the President was confirmed when, on March 29, 1927, President Calvin Coolidge, in a letter to the Secretary of Commerce, affirmed the action of the IRAC in assuming the responsibility on behalf of the President of advising him in regard to frequency assignments for the Government. Secretary of Commerce Hoover conveyed this message to the IRAC and from that time the Committee has acted as the coordinating mechanism in the assignment of frequencies of the Government. This procedure was confirmed by subsequent executive orders.

The first such was Executive Order 4846-A, signed by President Calvin Coolidge on March 30, 1928, which listed approximately 600 assignments between 17.6 and 22,625 kHz. It contained the following set of principles:

> "No department shall erect a new station in the proximity of an existing government station, unless the same is incapable of rendering to such department the service that it requires, which shall be determined only after careful consideration by the departments concerned or by the permanent interdepartment organization. Whenever practicable, such situation shall be met by the expansion of the existing stations, if necessary under joint contribution of the Departments interested. No department shall close a station no longer needed by it which is serving other Government departments without first making arrangements in respect to such service that are satisfactory to the departments being served."

In 1928, the Federal Radio Commission requested that it be invited to attend IRAC meetings. It was during the same year that the Committee first discussed an allocation table which would apportion frequency space between the Federal Radio Commission for non-Government stations and the IRAC for Government stations.

The 30's - A Coming of Age

The years following 1929 were marked by the increasing involvement of the Committee in the preparation of proposals for international meetings and conferences. Soon after 1929, the Committee first took up the problems of frequency allocations for television broadcasting and the aeronautical service. The result of such studies with respect to television was a recommendation by the Federal Radio Commission that the entire television service be accommodated in 200 kHz of spectrum space in the 2 MHz band. This is exactly one thirtieth of the space presently allocated for a single television channel. The studies of the Committee in respect of aviation were prompted by a desire to bring about a uniformity of aircraft communications and navigation aids and to avoid the duplication of stations and frequencies. To point out its thinking for the future at that time, the report stated that, although extensive use of radio for aviation had not yet materialized, the spectrum space then available for this service would probably prove to be inadequate. It was only a short time later, beginning in 1935, that the needs of the aviation service assumed a prominent place on the IRAC agenda when the Federal Government commenced the installation of air-navigation, air-ground and aeronautical point-to-point facilities on a large scale.

10th Anniversary in 1932, the Committee had grown to a membership including Agriculture, Commerce, Federal Radio Commission, Interior, tate Commerce Commission, Labor, Navy, Office of Chief Coordinator, ffice, Shipping Board, State, Treasury and War, with Mr. W. D. Terrell merce as chairman. Matters under consideration included:

- requests of War and Navy to use frequencies for tactical purposes;

- the fact that the field Army had approximately 1500 transmitters, the operation of which, it was stated, would necessitate the almost complete utilization of the radio spectrum;

- whether Government ships may use frequencies regularly assigned by the Federal Radio Commission when carrying on non-Government business with commercial stations; and

- the draft of a new Executive Order.

Communications Act of 1934, enacted on June 19, 1934, created a seven-ber Federal Communications Commission (FCC) as an independent agency to gulate interstate and foreign commerce in communication by wire and radio, cluding radio broadcasting and radio operations of state and local govern-nts. The Act continued the President's authority to assign radio frequencies stations belonging to and operated by the United States, and to control mmunications in an emergency.

resident Franklin Roosevelt wrote to the Chairman, FCC, on November 9, 935, suggesting that the IRAC continue to function as a clearing house n the detailed allocation of specific frequencies but that its reports nd draft executive orders be submitted through the Chairman, FCC. Again, n May 18, 1936, in a letter to the Chairman, IRAC, President Roosevelt sked the Committee to select one or more of its members to appear at a Hearing of the FCC with respect to the allocation of radio frequencies to the various classes of radio service, for the purpose of recording a coordinated estimate of the Government departments' requirements for radio frequencies in the then usable portions of the frequency spectrum.

tober 1940, an IRAC/FCC agreement was consumated whereby:

> "The Interdepartment Radio Advisory Committee will cooperate with the Federal Communications Commission in giving notice of all proposed actions which would tend to cause interference to non-Government station operation, and the Federal Communications Commission will cooperate with the Interdepartment Radio Advisory Committee in giving notice of all proposed actions which would tend to cause interference to Government station operation. Such notification will be given in time for the other agency to comment prior to final action. Final action by either agency will not, however, require approval by the other agency.
>
> "The two agencies will maintain up-to-date lists of their respective authorized transmitting frequency assignments."

s agreement has been followed by both parties ever since.

November 6, 1941, the IRAC approved a set of Bylaws covering its or-ization and procedures to replace the rules adopted for this purpose 1923. These Bylaws have been amended a number of times since and tinue to define the Committee's mission and functions.

The 40's - A Time of War and Postwar Planning

ring the late 1930's and early 1940's, when the rumblings of war in rope commenced to be heard in this country, the agenda of the IRAC curately reflected the successive phases of national emergency and tual involvement in war. In the war years, the Committee served in an visory capacity on radio frequency matters to the Defense Communications ard and to its successor, the Board of War Communications. The years 40 and 1941 showed a steadily increasing number of applications from e military agencies, particularly for their role in domestic aviation. 1942, there was a corresponding demand for overseas communication acilities. Still further expansion was noted in succeeding years as he scope of the war and the involvement of larger land and sea areas ictated. The extent of the radiocommunication facilities then required y the military to accommodate our operations in Europe and the Pacific as almost beyond comprehension. Such expansion was responsible, in 943, for the evolution of a significant landmark in the field of frequency llocations. In that year, an important agency of the Federal Government found its request for radio facilities denied in part by the IRAC because of the inability to find sufficient usable frequencies. Since that time, the satisfaction of frequency requirements has generally been accomplished with increasing difficulty, and then only through the willingness of the agencies concerned to accept increased sharing of spectrum resources and by the narrowing of frequency channels as the state of the art permits.

in World War II, the Committee realized that the end of hostilities foster a tremendous demand for frequencies, not only from those ities curtailed during the war but also from greatly expanded services as aviation and from new activities. It was likewise obvious that the tary establishment was not likely to recede to its prewar level. rdingly, the IRAC appointed a special subcommittee to consider postwar uency allocations. This included an exhaustive study of technical nces in electronic equipments and capabilities during the War. Many o experts of the industry presented their views to the subcommittee r to the issuance in June 1944 of its proposals for postwar spectrum cations. The final IRAC report was completed on June 27, 1945, after rporating minor changes resulting from coordination with the FCC follow- its hearing concerning the allocation of frequencies from 10 kHz to Hz.

the years from 1945 to 1947, the United States participated in a series conferences preparatory to the International Telecommunication Conferences d at Atlantic City, New Jersey, in 1947, and in the Atlantic City Con- ences themselves. During this period, the IRAC was primarily engaged the task of refining and perfecting United States proposals, especially reference to the Table of Frequency Allocations. As a result of IRAC/FCC rk, the U.S. Proposals embraced the important new concepts of: (1) a mpletely new Table extending the allocations to 30,000 MHz; (2) an gineered frequency list based upon the stated requirements of the various untries; and (3) an international frequency registration board which would amine proposed uses of frequencies for technical freedom from harmful terference before they were accorded status in an international frequency st. The Conference accepted the expanded allocation table (up to 10,500 z), established the International Frequency Registration Board and, to epare the engineered frequency list, the Provisional Frequency Board (PFB). he PFB was not successful as regards the fixed and land mobile services, d adjourned on February 28, 1950. The concept of engineered frequency lanning was embraced, however, particularly in the case of the aeronautical nd maritime radio services.

The 50's - A Reconstitution and an Increased Involvement in Spectrum Management

Executive Order 10297 of October 9, 1951, which arose from recommendations by the President's Communications Policy Board - March 1951, provided for a Telecommunications Advisor to the President (TAP) with the IRAC to advise and support him.

ovide the degree of coordination necessary for steering the imple-
tion of the Agreement adopted by an Extraordinary Administrative
Conference (Geneva 1951), held to resolve the issues resulting from
ailure of the PFB to establish a new high frequency list, a Technical
y Steering Committee (TPSC) was established on January 11, 1952, by
AP. This Committee, in turn, established an Executive Committee to
late a program and set up a procedure for carrying out the United
s obligations under the Agreement. As the work progressed it became
rent that coordination, efficiency and economy would be improved by
olidating the Executive Committee with the IRAC. Accordingly, the IRAC
reconstituted on October 6, 1952, with the Chairman to be designated by
TAP, and was assigned the additional responsibility of formulating and
mmending policies, plans and actions in connection with the management
usage of radio frequencies by the Government agencies. The FCC withdrew
regular member of the IRAC and, in lieu thereof, appointed a liaison
resentative to enable the Commission and the IRAC to work jointly in
solution of mutual problems. A Frequency Assignment Subcommittee was
ablished at the same time.

June 16, 1953, President Dwight Eisenhower accepted the resignation of
Telecommunications Advisor to the President and issued Executive Order
60 abolishing that position and transferring the functions to the Director
the Office of Defense Mobilization. The Order specified that the IRAC
uld report to and assist the Director of Defense Mobilization in the
rformance of his functions.

June 30, 1953, the IRAC completed a program for the establishment of a
chine record system for frequency assignments, elimination of a backlog
at had accumulated since 1942, and maintenance of the record in current
atus. Prior to this time, assignment records had been maintained manually
a file of five-by-eight cards.

November 5, 1953, the IRAC established principles for the assignment and
e of radio frequencies by Government agencies, including assurance that
equests are justified and assignments are used and not stored. Application
f these principles resulted in the discontinuance of priority notes on
ssignments which theretofore had been a basis for settlement of inter-
erence cases.

uring 1953 and 1954, implementation of the Agreement (Geneva 1951) occupied
he major attention of the Committee. Also during those years, a procedure
ile was developed for use by the FAS in the assignment of frequencies.
his file evolved from a review of the IRAC Bylaws and Minutes. Although
useful to some extent, the File was far from complete and many decisions
had to be made without benefit of rule.

tive Order 10571-A was issued on October 26, 1954, and assigned fre-
cies to Government radio stations as of April 1, 1954. For the first
since 1928 all station assignments were listed for review and con-
ation by the President. This list contained approximately 60,000
gnments, a hundred-fold increase over the earlier one.

955, with the major portion of the task of implementing the 1951 EARC
ement completed, emphasis shifted to the matter of frequency allocations.
trend continued and was further emphasized in the latter part of the
when the Select Subcommittee on Frequency Allocations (SSFA) was
blished. The SSFA was to ensure equitable distribution of spectrum
ce among various radio services, provide for the most effective utilization
the radio spectrum, minimize harmful interference, and lay the groundwork
preparation for the next international radio conference. FCC agreed to
k with the SSFA on these goals.*

the suggestion of the IRAC/SSFA, in 1956 the Office of Defense Mobili-
ion advised the Heads of all Government Departments and Agencies of the
d for close coordination between those responsible for research and
velopment and those responsible for frequency management.

ecutive Order 10695-A was issued on January 16, 1957 assigning frequencies
Government radio stations as of July 1, 1956. It stated that the par-
culars of assignments shall be maintained in the official records of the
AC and that the Committee may, subject to approval by the Director of
e Office of Defense Mobilization, authorize the use of frequencies by
vernment agencies. This was the last time that the List of Frequency
signments to Government Radio Stations was accompanied by an Executive
rder.

n 1956, taking cognizance of the forthcoming World Administrative Radio
onference scheduled to be held during the latter part of 1959, the Committee
ommenced its work of reviewing the Table of Frequency Allocations, the
rocedure for the international notification and registration of frequency
ssignments, the future status of the International Frequency Registration
oard (IFRB) and the new International Frequency List (IFL), with the
bjective of preparing coordinated Executive Branch proposals therefor.

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* The name of the subcommittee was changed to the Subcommittee on Frequency Allocations in 1958 and to the Technical Subcommittee in 1964. In each instance its terms of reference were modified to make it more responsive to the needs of the Main Committee. It is presently responsible for the development of management provisions in the area of technical standards, minimum performance requirements and equipment criteria.

the substantial completion in 1958 of its work in connection with the lation of the U.S. proposals for the Administrative Radio Conference, IRAC/SFA resumed its planning of a more long-range character for the e use of the radio spectrum. This activity was still further expanded pril 1959 by becoming a joint effort of the FCC and OCDM (which later me the OEP) with the IRAC/SFA acting as the technical level study group the OCDM. A report covering the study of the band 50-1215 MHz was leted in December 1959.

ebruary 18, 1959, IRAC promulgated to all Federal users of radio a dination procedure for the protection of the National Radio Quiet -- an area embracing radio astronomy observatories in the vicinity he National Radio Astronomy Observatory at Green Bank, West Virginia, the U.S. Naval Research Station at Sugar Grove, West Virginia.

August 1959, for one of the very few times in the history of frequency ters, the President involved himself directly in radio frequency allo- ions. A decision by the President was required because the demand eeded the supply and because the military departments were reluctant relinquish certain frequencies assigned by Executive Order, which ither the IRAC nor the Director, OCDM, had authority to modify or with- aw. The President approved the reallocation of the frequency band 132- 5 MHz to the aeronautical mobile (R) service for air traffic control and e band 135-136 MHz for space service as recommended by the Director, OCDM.

The 60's - A First Look at Space

1959, a Plenipotentiary Conference and an Ordinary Administrative Radio onference of the ITU were held. Because of the excellent preparation by he FCC/OCDM (IRAC), most of the objectives sought by the U.S. were realized. hese included allocations for the first time for radiolocation/radars, which had, heretofore, been accommodated in the radionavigation bands), pace research and radio astronomy. The Senate consented and advised rati- fication of the Geneva, 1959, International Telecommunication Convention and Radio Regulations on September 25, 1961. The President ratified the Treaty on October 4, 1961. The myriad of details involved in the National implementation of the Radio Regulations, Resolutions and Recommendations adopted at that Conference took up a considerable part of the Committee's time during the next few years. As a sign of the times, the National Aeronautics and Space Administration became a member of the IRAC in 1960.

in that year, the IRAC began preparation for the Extraordinary
istrative Radio Conference to Allocate Frequency Bands for Space
communication purposes, Geneva, 1963. One of the first actions was
uest to all Government agencies to submit their estimates of need for
communications through 1970. Many joint meetings of the IRAC with
CC Liaison Representative led to the development of draft U.S. pro-
s. At various stages, these were coordinated with other Administrations
igh U.S. embassies throughout the world, by means of bilaterial and multi-
tal meetings, and, in some cases, by teams of experts visiting with tele-
mication officials of other countries.

while, the Telecommunications Office, OCDM, sent a memorandum to all
ral agencies which outlined the interim criteria to be used in the
ew of radio frequency proposals for space communications. The IRAC
erated the policy that the entire radio spectrum is subject to adjust-
t when required in the national interest.

July 1961, the President's Policy on Communication Satellites was issued.
luded therein was a statement that the Federal Government would be re-
nsible for assuring the effective use of the radio spectrum, as well as
uring the ability to discontinue the electronic functioning of satellites
n required in the interest of communication efficiency and effectiveness.
a follow-up, the IRAC issued a Notice to All Federal Users of Radio which
tained the statement that the Committee "will hereafter authorize the use
frequencies by space transmitters in satellites and other space vehicles
ich are launched into space, only in those cases where such vehicles are
equipped to assure the ability to discontinue radio emissions therefrom."

lso in 1961, the IRAC developed and approved a Government Table of Frequency
llocations below 25 MHz and, shortly thereafter, produced a consolidated
overnment Table of Frequecy Allocations from 10 kHz to 40 GHz. As an
xample of the nature of this planning, channeling for the band 406-420 MHz
as changed from 100 kHz to 50 kHz to effectively provide for twice the
umber of operations.

leetings were held with Canada early in 1962 and again in October 1964 to
xtend to certain other bands above 30 MHz the procedure for the coordination
of proposed frequency assignments in the U.S./Canada border zones which had
begun in 1956, in the band 162-174 MHz. This procedure has been instrumental
in minimizing the possibility of interference between the two countries in
the use of radio frequencies.

result of Resolution No. 3 of the Administrative Radio Conference
va, 1959) a Panel of Experts was convened in September 1961 and again
me 1963, to devise ways and means of relieving the pressure on the
spectrum between 4 and 27.5 MHz. Although some implementation was
on a voluntary basis almost immediately, the IRAC's formal recommenda-
s with respect to the National implementation thereof were not adopted
l the end of 1964. Accelerated conversion to single sideband operation
the major result.

utive Order 10995, of February 16, 1962, established the position of
ctor of Telecommunications Management (DTM), to be held by one of the
stant Directors of the Office of Emergency Planning (formerly ODM and
). Consistent with the authority granted the Director, OEP, the DTM
delegated the authority vested in the President to assign, amend,
ify or revoke frequency assignments to Government agencies, and he was
horized to exercise during a war emergency the authority vested in the
sident by subsections 606 (a), (c) and (d) of the Communications Act of
4, as amended. Executive Order 10995 stated that the DTM could continue
IRAC to serve in an advisory capacity, if he deemed it necessary or
isable.

1962 there were established, as permanent substructures of the Frequency
signment Subcommittee, an Aeronautical Assignment Group and a Military
signment Group. These were designed to take interim actions on behalf
the FAS on all Government applications and non-Government memoranda in
rtain bands which were predominantly aeronautical and military, respectively.

order to coordinate more effectively the work of the FAS and that of the
RAC and the Office of the Director of Telecommunications Management, the
TM extended to the FAS in 1962 the policy which had been adopted ten years
arlier in respect of the IRAC, namely the designation of its officers from
mong the staff of the DTM. Previously, the chairmanship had been rotated
n an annual basis among the agency membership.

n that same year, the IRAC approved Radar Engineering Design Objectives
s a means of making more effective and efficient use of the bands allo-
cated to the radiolocation service. Also, a contract was undertaken to
survey the data, techniques, procedures and policies used by the IRAC and
its components in the assignment of frequencies to Government stations,
with a view to improvement and development of changes needed to enhance
the application of computer techniques.

e results of the Space EARC in December 1963 triggered a lengthy series f special meetings looking toward the national implementation of its inal Acts. These IRAC meetings carried into the middle of 1964. Following coordination with Canada of the mutual national intentions, a revised overnment Table of Frequency Allocations, which incorporated the majority f the new international allocations to the space and radio astronomy services, was made effective January 1, 1965.

In late 1964, the DTM issued a Notice to all Federal Users of Telecommunications prescribing the status, mission and functions of the IRAC in order to clarify and strengthen the role of the Committee.

On October 20, 1964, the IRAC recommended to the DTM that a letter be sent to the Government agencies about the need to ascertain that radio frequencies are available before obligating funds for research, development and operational projects requiring radio frequencies. This was to forestall a repetition of certain instances where large sums of money were spent for radio equipment only to find it could not be accommodated in the spectrum space for which it was designed.

The IRAC approved a new Table of Frequency Tolerances on February 23, 1965 which met all standards as adopted by the ITU and, in many respects, made improvements to those standards.

On March 9, 1965, the IRAC approved as a working document a draft Manual of Regulations and Procedures for Frequency Management. After approval by the DTM, on August 2, 1965, copies were distributed to all Government users of radio and became a guideline for constant daily use. The Manual, which is revised periodically, goes into considerable detail as to the methods to be employed in determining the need for and justification of the use of radio frequencies and the procedure to be followed for spectrum use.

An International Notification Group (ING) was established in May 1965, as a permanent substructure of the IRAC, having as its normal functions the preparation of responses to the International Telecommunication Union concerning questionnaires and other correspondence related to the notification of United States frequency assignments, and the drafting of rules and procedures for the notification of those assignments.

The year 1965 found a change in philosophy as between agency stated requirements and the Committee. In response to a comment by an agency representative that "... Government members do not have the ... prerogative of questioning requirements; that it is the responsibility of the individual agency to determine the requirements necessary to support its own statutory responsibilities, and the responsibility of the IRAC to satisfy the requirements presented on the basis of technical and related factors," the Chairman

stated that "the Director of Telecommunications Management expects something more of the IRAC than merely the satisfaction of presented requirements on the basis of technical and related factors." He said, "It is the view of the OTM that: (a) each agency has the right to determine if it has a communications requirement; (b) each agency has the right to determine if that requirement should be satisfied by radio; and (c) it is the IRAC/DTM prerogative to determine whether frequencies can and should be assigned to meet that requirement."

In 1965, the probability of interference from an Air Force/FAA radio station to an earth station, proposed on the Island of Oahu by the Communications Satellite Corporation some 13 miles away, necessitated field measurements, testimony of experts, discussion at high levels and eventual conditions laid on by the DTM. Shortly thereafter, the IRAC developed a policy statement, which was approved by the DTM, as follows: "In principle, spurious emissions from stations of one radio service shall not cause harmful interference to stations of the same or another radio service within recognized service areas of the latter stations, whether operated in the same or different frequency bands."

During 1966 and 1967, the Committee was involved, together with the FCC Liaison Representative, in preparation for the World Administrative Radio Conference to Deal with Matters Relating to the Maritime Mobile Service to be held in September 1967. This involved the development of Preliminary Views of the U.S.A. which were distributed abroad, a series of meetings with selected countries to discuss the Preliminary Views and comments thereon, and the submission to the ITU Secretary General of the Proposals of the U.S.A.

On September 7, 1966, the processing of frequency applications of Government agencies by the newly developed computer system, which grew out of the study undertaken in 1962, was begun after approximately four years of study and development. Shortly thereafter, the fruits of this labor began to pay off in the provision of frequency management data not previously possible or feasible.

In 1966, the IRAC had been asked to study and comment as to the effect on the radio spectrum of the trend toward the use of higher transmitter powers and the desirability of imposing a power ceiling. After a detailed review, it was concluded that there was no alternative to high power in certain cases, and that high power was but one of many factors contributing to spectrum pollution, others including a proliferation of low power electronic devices, harmonics and other spurious emissions. Accordingly, the IRAC recommended to the ODTM that a power ceiling not be applied, that all users of radio follow the maxim that the power used should be the minimum

essential in each particular case. It observed that the reduction of spurious emissions and the development of minimum performance requirements would be more productive in the alleviation of spectrum pollution than a power ceiling.

In the latter half of 1967, the IRAC developed a statement of National Objectives for the Use of the Radio Spectrum, with the FCC Liaison Representative concurring.

The IRAC had been criticized for making many assignments without a termination date. Although there had been numerous review programs on a selective basis, e.g., by bands or services, there had been no policy for the periodic review of all assignments which, by the terms of their authorizations, had no ending date. In the latter part of 1967, for implementation in 1968, the IRAC approved a policy for the periodic review of Government frequency assignments. The review procedure is on a five-year cycle. The procedure serves to eliminate "deadwood", update remaining assignments and make the master file of Government assignments much more useful in engineering new assignments. These review procedures and changed operational requirements made it possible to tell the FCC Chairman on June 3, 1968, that 26 MHz in the band 890-942 MHz could be returned to the FCC for non-Government use. Also, on November 17, 1969, FCC was told of Government readiness to share most of the radiolocation bands then allocated for exclusive Government use (some 7550 MHz of spectrum).

As the result of a study in 1968 to improve frequency management at the local level, the Committee compiled a list of all existing recognized mechanisms by which Government frequency coordination is effected in the field; it developed a Directory of Field Contacts for use by the numerous contacts in the field for coordination before and after an assignment, and for the resolution of interference; and it began a procedure for local coordination and engineering in the band 1435-1535 MHz in the Los Angeles area as a test case. This was recently expanded to include the pre-assignment coordination throughout the conterminous United States for land-based radiolocation and radionavigation operations on 1030 MHz and in the bands 1215-1400, 2700-2900, and 9000-9200 MHz and all operations in the band 1435-1535 MHz.

In 1968, after determination by the Administrative Council of the International Telecommunication Union that a World Administrative Radio Conference for Space Telecommunications would be convened in 1970 or 1971, the IRAC assigned the preparatory work to its Spectrum Planning Subcommittee.

Following a pattern established in the preparation for earlier major radio conferences, the preparatory effort produced a recommended agenda for the Conference, Preliminary Views of the U.S.A. in August 1969, draft U.S.A. Proposals in August 1970; U.S.A. Proposals in December 1970; and U.S.A. Position Papers in May 1971. Once again, the Preliminary Views and draft Proposals were distributed world-wide for comments, were discussed in multilateral and bilateral meetings with other administrations, were the subject of briefings by U.S. teams in selected foreign countries and were molded into the formal U.S.A. Proposals for consideration by the Conference.

Also in 1968, implementation of the Final Acts of the WARC to deal with matters relating to the maritime mobile service was begun.

In 1969, the IRAC implemented a frequency usage program for that portion of the spectrum between 4 and 30 MHz. Quantitative data depicting the extent to which Government frequency resources are actually used are collected and recorded against individual assignments on a quarterly basis. This program has highlighted the two extremes of usage, thus facilitating the elimination of unused frequency assignments, indicating those operations requiring more frequency support, and improving sharing possibilities.

Recognizing the growing threat of spectrum pollution and the increasing need for electromagnetic compatibility, the terms of reference of its Spectrum Planning Subcommittee (which had been established in 1966 as a means of reemphasizing the frequency allocation function of the Committee) were expanded to include procedures enabling that subcommittee to:

- Develop and maintain pertinent documentation on all planned and operational satellite systems including their technical and operational characteristics;

- Ascertain in the early stages of system concept development, where compatibility may not exist;

- Make recommendations as to potential electromagnetic compatibility problem areas, and propose courses of action to resolve these problems;

- Make recommendations as to technical parameters necessary to facilitate sharing between systems; and

- Review as appropriate the effectiveness of existing systems with a view toward rectifying compatibility deficiencies.

In recent years there has been greater sharing of the spectrum as between Government and non-Government, and a decrease in exclusive allocations to Government services. For example, the percentage of the spectrum between 25 MHz and 40 GHz allocated exclusively to Government use has been reduced from 46% in 1969 to 28% now, with a corresponding increase in shared allocations. During that same period the amount of spectrum allocated exclusively to non-Government has remained at 34%.

On the occasion of the first manned landing on the moon and the subsequent moon-walk on July 20, 1969, the IRAC experienced a sense of participation in having provided the frequencies and the liaison mechanism ensuring the cooperation of other users so as to avoid possible interference, the whole assuring the outstanding communication during the entire operation.

The 70's - A Growing Role in Spectrum Management

On September 4, 1970, President Richard Nixon issued Executive Order 11556 which delineated functions and delegated certain authorities as regards telecommunications and spectrum matters to the new Office of Telecommunications Policy. Clay T. Whitehead was sworn in as Director on September 22, 1970 and one of his first actions was to retain the services of the IRAC to advise him on spectrum matters. By coincidence, the aforementioned swearing-in-date for the new Director was also the occasion of the 1000th Meeting of the IRAC. The Director met with the Committee that day.

Mid-1971 witnessed the climax in preparation for the World Administrative Radio Conference for Space Telecommunications, Geneva, June 7 - July 17, 1971, with the completion of U.S. Position Papers (some 700 pages in all). IRAC played a key role in this effort. Although the U.S. went into the Conference with strong opposition to some of its proposals, the results were most favorable and proved the value of thorough preparation, advance coordination and a delegation composed of experts in all facets of telecommunications.

Also in 1971, a new Emergency Readiness Plan for the Use of the Radio Frequency Spectrum was approved and distributed to the Government agencies. This outlines the policy, objectives, scope and responsibilities during a war emergency, together with planned uses of frequencies during such a period. Also in 1971, Radar Spectrum Engineering Criteria were adopted for high power systems because of their interference potential.

At the request of the Director of Telecommunications Policy, the IRAC recently developed a statement on the nature and magnitude of the Government's use of the radio spectrum. This statement advised that:

- the total U.S. Government investment in communications-electronics equipment is approximately $50 billion;
- the number of U.S. Government equipments operating throughout the radio spectrum is in the millions;
- the number of U.S. Government radio frequency assignments is approximately 120,000; and
- the variety of the Federal Agency missions which depend on radio is innumerable - the importance incalculable.

Telecommunications, with considerable stimulation from the IRAC, has come a long way in fifty years. It is expected that IRAC will contribute to further advances in the future. Major matters currently under study in the Committee include:

- implementation of the Final Acts of the 1971 World Administrative Radio Conference for Space Telecommunications;
- preparation for the 1974 World Administrative Radio Conference to Deal with Matters Related to the Maritime Mobile Service;
- improved decision methodologies in spectrum management -- electromagnetic compatibility analysis, economic factors, etc.;
- development and improvement of spectrum related standards for radiocommunication; and
- the processing of some 50,000 applications for frequency assignments to Government radio stations each year.

* * * * *

The membership of the IRAC during its first fifty years is reflected in Attachment 1. A recent photograph of the Committee is in Attachment 2.

Attachment 1

MEMBERSHIP OF THE IRAC FROM 1922

AGENCY OR OFFICE	YEAR 1922	1923	1924	1925
CHAIRMAN	S. W. Stratton (Commerce)	C. H. Huston (Commerce) S. B. Davis (Commerce)	S. B. Davis (Commerce)	S. B. Davis (Commerce)
SECRETARY	J. H. Dellinger (Commerce)	L. E. Whittemore (Commerce)	L. E. Whittemore (Commerce)	W. E. Downey (Commerce)
AGRICULTURE	W. A. Wheeler	W. A. Wheeler	W. A. Wheeler	W. A. Wheeler
COMMERCE	S. W. Stratton	C. H. Huston	S. B. Davis	S. B. Davis
INTERIOR	O. P. Hood	O. P. Hood	O. P. Hood	O. P. Hood H. A. Brown
INTERSTATE COMMERCE COMMISSION	Became Member in 1923.	T. A. Gillis	T. A. Gillis	T. A. Gillis
JUSTICE	S. Ely	S. Ely G. E. Strong	G. E. Strong	Inactive until 1935.
LABOR	A. E. Cook	A. E. Cook	A. E. Cook	A. E. Cook
NAVY	D. C. Bingham	D. C. Bingham R. McLean	R. McLean	R. McLean
OFFICE OF CHIEF COORDINATOR	H. P. Perrill	H. P. Perrill	J. P. Jackson	J. P. Jackson
POST OFFICE	J. C. Edgerton	P. Henderson	P. Henderson	P. Henderson
SHIPPING BOARD	F. P. Guthrie	L. L. Lee	L. L. Lee	H. C. Moore
STATE	W. S. Rogers	E. C. Wynne	E. C. Wynne W. R. Vallance	W. R. Vallance
TREASURY	L. J. Heath	L. J. Heath E. M. Webster	E. M. Webster	E. M. Webster
WAR	G. O. Squier	G. O. Squier L. B. Bender	L. B. Bender	L. B. Bender J. O. Mauborgne

AGENCY OR OFFICE	1926	1927	1928	1929	1930
CHAIRMAN	S. B. Davis (Commerce)	S. B. Davis (Commerce)	W. D. Terrell (Commerce)	W. D. Terrell (Commerce)	W. D. Terrell (Commerce)
SECRETARY	W. E. Downey (Commerce)	W. E. Downey (Commerce)	W. E. Downey (Commerce)	W. E. Downey (Commerce)	W. E. Downey (Commerce)
AGRICULTURE	W. A. Wheeler	W. A. Wheeler	M. Salisbury	M. Salisbury	M. Salisbury
COMMERCE	S. B. Davis	S. B. Davis W. D. Terrell	W. D. Terrell	W. D. Terrell	W. D. Terrell
FEDERAL RADIO COMMISSION	F.R.C. established in 1927. First representation in 1930.				C. B. Joliffe
INTERIOR	H. A. Brown	H. A. Brown	H. A. Brown	H. A. Brown	H. A. Brown
INTERSTATE COMMERCE COMMISSION	T. A. Gillis	T. A. Gillis	T. A. Gillis	T. A. Gillis	T. A. Gillis
LABOR	A. E. Cook	A. E. Cook	A. E. Cook	A. E. Reitzel	A. E. Reitzel
NAVY	R. McLean	R. McLean T. T. Craven	T. T. Craven	S. C. Hooper	S. C. Hooper
OFFICE OF CHIEF COORDINATOR	J. P. Jackson	J. P. Jackson C. R. P. Rogers	C. R. P. Rogers	C. R. P. Rogers	C. R. P. Rogers W. F. Jacobs
POST OFFICE	P. Henderson	P. Henderson	E. B. Wadsworth	E. B. Wadsworth	E. B. Wadsworth
SHIPPING BOARD	H. C. Moore	H. C. Moore	H. C. Moore	H. C. Moore	H. C. Moore
STATE	W. R. Vallance	W. R. Vallance	W. R. Vallance	W. R. Vallance	W. R. Vallance
TREASURY	E. M. Webster	E. M. Webster	E. M. Webster	E. M. Webster	E. M. Webster
WAR	J. O. Mauborgne	J. O. Mauborgne	W. R. Blair	W. R. Blair	W. T. Guest

AGENCY OR OFFICE	1931	1932	1933	1934	1935
CHAIRMAN	W. D. Terrell (Commerce)	W. D. Terrell (Commerce)	W. D. Terrell (FRC)	W. D. Terrell (FCC)	W. D. Terrell (FCC)
SECRETARY	W. E. Downey (Commerce)	W. E. Downey (Commerce)	G. C. Gross (FRC)	G. C. Gross (FCC)	G. C. Gross (FCC)
AGRICULTURE	M. Salisbury	M. Salisbury	M. Salisbury	E. W. Loveridge	E. W. Loveridge
COMMERCE	W. D. Terrell	W. D. Terrell	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger
FEDERAL COMMUNICATIONS COMMISSION	C. B. Joliffe	C. B. Joliffe	C. B. Joliffe	C. B. Joliffe	C. B. Joliffe
INTERIOR	H. A. Brown	H. A. Brown	C. M. Koon	C. M. Koon	C. M. Koon
INTERSTATE COMMERCE COMMISSION	T. A. Gillis	T. A. Gillis	T. A. Gillis	T. A. Gillis	T. A. Gillis
JUSTICE					C. A. Tolson
LABOR	A. E. Reitzel	A. E. Reitzel	A. E. Reitzel	A. E. Reitzel	A. E. Reitzel
NAVY	S. C. Hooper	S. C. Hooper	S. C. Hooper	S. C. Hooper	S. C. Hooper
OFFICE OF CHIEF COORDINATOR	W. F. Jacobs	W. F. Jacobs	A. Staton		
POST OFFICE	E. B. Wadsworth	E. B. Wadsworth	E. B. Wadsworth	C. P. Graddick	C. P. Graddick
SHIPPING BOARD	H. C. Moore	H. C. Moore	H. C. Moore		
STATE	I. Stewart	I. Stewart	I. Stewart	I. Stewart	F. C. de Wolf
TREASURY	E. M. Webster	E. M. Webster	E. M. Webster	E. M. Webster	M. J. Ryan
WAR	W. T. Guest	W. T. Guest	R. B. Colton	R. B. Colton	R. B. Colton

F.R.C. functions taken over by FCC in 1934.

OR OFFICE	1936	1937	1938	1939	1940
CHAIRMAN	E. O. Sykes (FCC)	E. O. Sykes (FCC)	E. O. Sykes (FCC)	E. K. Jett (FCC)*	E. K. Jett (FCC)
SECRETARY	G. C. Gross (FCC)	G. C. Gross (FCC)	G. C. Gross (FCC)	G. C. Gross (FCC)	G. C. Gross (FCC)
AGRICULTURE	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge
CIVIL AERONAUTICS ADMINISTRATION	C. A. A. established in 1938. First representation in 1939.			W. E. Jackson	W. E. Jackson
COMMERCE	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger
FEDERAL COMMUNICATIONS COMMISSION	T. A. M. Craven	T. A. M. Craven	T. A. M. Craven E. K. Jett	E. K. Jett	E. K. Jett
INTERIOR	C. M. Koon	C. M. Koon C. D. Monteith	C. D. Monteith	C. D. Monteith	C. D. Monteith
INTERSTATE COMMERCE COMMISSION	T. A. Gillis	Not represented since 1937			
JUSTICE	C. A. Tolson	C. A. Tolson	C. A. Tolson T. D. Quinn	T. D. Quinn	T. D. Quinn
LABOR	A. E. Reitzel	A. E. Reitzel	A. E. Reitzel	A. E. Reitzel	A. E. Reitzel
NAVY	S. C. Hooper	S. C. Hooper	S. C. Hooper	S. C. Hooper	S. C. Hooper
POST OFFICE	C. P. Graddick	C. P. Graddick	C. P. Graddick	C. P. Graddick	C. P. Graddick R. M. Martin
STATE	F. C. de Wolf	F. C. de Wolf	F. C. de Wolf	F. C. de Wolf T. Burke	T. Burke
TREASURY	F. A. Zeusler	J. F. Farley	J. F. Farley	J. F. Farley	J. F. Farley
U.S. MARITIME COMMISSION	Commission created in 1936.	D. S. Brierley	D. S. Brierley	D. S. Brierley	D. S. Brierley
WAR	D. M. Crawford	D. M. Crawford	D. M. Crawford	J. O. Mauborgne	J. O. Mauborgne

*During 1939-1952 the Chairmanship is indicated for period beginning April 1 of each year.

AGENCY OR OFFICE	1941	1942	1943	1944	1945
CHAIRMAN	J. H. Dellinger* (Commerce)	J. H. Dellinger* (Commerce)	T. A. M. Craven* (FCC)	P. D. Miles* (Navy)	E. M. Webster* (Treasury)
SECRETARY	G. C. Gross (FCC)	P. F. Siling (FCC)	P. F. Siling (FCC)	P. F. Siling (FCC) M. H. Woodward (FCC)	M. H. Woodward (FCC)
AGRICULTURE	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge
CIVIL AERONAUTICS ADMINISTRATION	Represented by Commerce since 1941.				
COMMERCE	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger
FEDERAL COMMUNICATIONS COMMISSION	E. K. Jett	T. A. M. Craven	T. A. M. Craven	T. A. M. Craven E. K. Jett	E. K. Jett
INTERIOR	C. D. Monteith	C. D. Monteith S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes
JUSTICE	T. D. Quinn	T. D. Quinn	T. D. Quinn E. P. Coffey	E. P. Coffey	E. P. Coffey
LABOR	C. V. McLaughlin	Member but no representative.			
NAVY	S. C. Hooper	S. C. Hooper G. L. Caswell P. D. Miles	P. D. Miles	P. D. Miles	P. D. Miles
POST OFFICE	R. M. Martin	R. M. Martin	R. M. Martin	R. M. Martin	R. M. Martin
STATE	T. Burke	T. Burke	T. Burke H. B. Otterman	H. B. Otterman	H. B. Otterman
TREASURY	J. F. Farley	J. F. Farley E. M. Webster	E. M. Webster	E. M. Webster	E. M. Webster
U.S. MARITIME COMMISSION	D. S. Brierley	D. S. Brierley	D. S. Brierley	D. S. Brierley	D. S. Brierley
WAR	J. O. Mauborgne W. T. Guest	W. T. Guest A. G. Simson	A. G. Simson	A. G. Simson	A. G. Simson

*During 1939-1952, the Chairmanship is indicated for period beginning April 1 of each year.

OR OFFICE	1946	1947	1948	1949	1950
CHAIRMAN.	A. G. Simson* (War)	J. H. Dellinger* (Commerce)	S. L. Windes* (Interior)	J. R. Moore* (Navy) J. S. Cross (State)	D. E. McKay* (Treasury) L. H. Simson (Commerce)
SECRETARY	M. A. Price (FCC)	M. A. Price (FCC)	M. A. Price (FCC)	M. A. Price (FCC)	M. A. Price (FCC)
AGRICULTURE	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge	E. W. Loveridge
AIR FORCE	Evolved out of War Department in 1947.		J. D. Flashman	J. D. Flashman R. G. Hall	R. G. Hall
ARMY	Evolved out of War Department in 1947.		C. W. Janes	C. W. Janes W. M. Lauterbach	W. M. Lauterbach
CENTRAL INTELLIGENCE AGENCY	Established in 1950.				
COMMERCE	J. H. Dellinger	J. H. Dellinger	J. H. Dellinger L. H. Simson	L. H. Simson	L. H. Simson
FEDERAL COMMUNICATIONS COMMISSION	P. D. Miles	P. D. Miles A. L. McIntosh	A. L McIntosh	A. L. McIntosh	A. L. McIntosh
INTERIOR	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes
JUSTICE	R. T. Harbo	R. T. Harbo	I. W. Conrad	I. W. Conrad	I. W. Conrad M. W. Khurtz
NAVY	Henry Williams, Jr.	Henry Williams, Jr. J. R. Moore J. M. Grider	J. R. Moore	J. R. Moore J. M. Grider	J. M. Grider
POST OFFICE	R. M. Martin				
STATE	H. B. Otterman J. S. Cross	J. S. Cross	J. S. Cross	J. S. Cross	J. S. Cross
TREASURY	E. M. Webster D. E. McKay	D. E. McKay	D. E. McKay	D. E. McKay	D. E. McKay E. K. Rhodes
U.S. MARITIME	D. S. Brierley	D. S. Brierley A. Osborne	A. Osborne	A. Osborne	A. Osborne
WAR	A. G. Simson	A. G. Simson			

*During 1939-1952 the Chairmanship is indicated for period beginning April 1 of each year.

AGENCY OR OFFICE	1951	1952	1952 (From 6 Oct.)	1953	1954	1955
CHAIRMAN*	L. H. Simson** (Commerce)	S. L. Windes** (Interior)	W. M. Lauterbach (TAP)	W. M. Lauterbach (TAP)	W. E. Plummer (ODM)	W. E. Plummer (ODM)
EXECUTIVE SECRETARY	M. A. Price (FCC)	M. A. Price (FCC)	C.W. Loeber (TPSC)	C.W. Loeber (ODM)	C.W. Loeber (ODM)	P. D. Miles (ODM)
AGRICULTURE	E. W. Loveridge	E. W. Loveridge E. C. Wagner	E. C. Wagner	E. C. Wagner	E. C. Wagner	E. C. Wagner
AIR FORCE	R. G. Hall	R. G. Hall	R. G. Hall J. D. Corley	J. D. Corley	J. D. Corley	J. D. Corley
ARMY	W. M. Lauterbach	W. M. Lauterbach E. R. Reynolds	E. R. Reynolds	E. R. Reynolds	E. R. Reynolds	E. R. Reynolds E. J. Holliman
CENTRAL INTELLIGENCE AGENCY	W. O. Edwards W. E. Plummer	W. O. Edwards E. R. Blankinship R. P. Scott	Not included in the reorganization of the Committee.			
COMMERCE	L. H. Simson	L. H. Simson	L. H. Simson	L. H. Simson	L. H. Simson	L. H. Simson
FCC ***	A. L. McIntosh	A. L. McIntosh	A. L. McIntosh	A. L. McIntosh	A. L. McIntosh	A. L. McIintosh
INTERIOR	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes
JUSTICE	M. W. Kuhrtz	M. W. Kuhrtz	M. W. Kuhrtz	M. W. Kuhrtz	M. W. Kuhrts A.J. Baker	A. J. Baker
NAVY	J. M. Grider	J. M. Grider	T. P. Lowndes	T. P. Lowndes	T. P. Lowndes E. L. Margolf	E. L. Margolf
STATE	J. S. Cross	J. S. Cross	J. S. Cross	J. S. Cross	J. S. Cross	J. S. Cross C. G. Harrison
TREASURY	E. K. Rhodes	E. K. Rhodes	E. K. Rhodes	E. K. Rhodes	E. K. Rhodes G. V. Graves	G. V. Graves
USIA	Became member 1955.					E. T. Martin

*Committee reorganized October 6, 1952, absorbing functions of former Executive Committee of TPSC.

**During 1939-1952, the Chairmanship is indicated for period beginning April 1 of each year.

***Under Committee reorganization, October 6, 1952, FCC membership discontinued with the understanding that henceforth joint IRAC/FCC meetings would be held in which case a Liaison Representative would speak for the FCC.

OR OFFICE	1956	1957	1958	1959	1960
CHAIRMAN	W. E. Plummer (ODM)	W. E. Plummer (ODM)	W. E. Plummer (ODM/OCDM)	W. E. Plummer (OCDM)	W. E. Plummer (OCDM)
EXECUTIVE SECRETARY	P. D. Miles (ODM)	P. D. Miles (ODM)	P. D. Miles (ODM/OCDM)	P. D. Miles (OCDM)	P. D. Miles (OCDM)
AGRICULTURE	E. C. Wagner	E. C. Wagner	E. C. Wagner	E. C. Wagner	E. C. Wagner
AIR FORCE	J. D. Corley J. D. Flashman	J. D. Flashman	J. D. Flashman	J. D. Flashman	J. D. Flashman
ARMY	E. J. Holliman	E. J. Holliman	E. J. Holliman	E. J. Holliman	E. J. Holliman J. Clapper, Jr.
COMMERCE	L. H. Simson	L. H. Simson A. Barnabei	A. Barnabei	A. Barnabei* R. C. Kirby	R. C. Kirby A. Barnabei**
FAA***	Became member 1958.		W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne
FCC (LIAISON)	A. L. McIntosh	A. L. McIntosh	A. L. McIntosh	A. L. McIntosh W.H. Watkins	W. H. Watkins
INTERIOR	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes
JUSTICE	A. J. Baker	A. J. Baker L. G. Hailey	L. G. Hailey	L. G. Hailey	L. G. Hailey
NASA	Became member September 26, 1960.				J. B. McElroy
NAVY	E. L. Margolf	E. L. Margolf L. R. Raish	L. R. Raish	L. R. Raish	L. R. Raish
STATE	C. G. Harrison	C. G. Harrison A. L. Lebel	A. L. Lebel	A. L. Lebel	A. L. Lebel
TREASURY	G. V. Graves	G. V. Graves	G. V. Graves J. L. Stewart	J. L. Stewart	J. L. Stewart
USIA	E. T. Martin	E. T. Martin	E. T. Martin G. Jacobs	G. Jacobs	G. Jacobs

*By agreement between the Secretary of Commerce and the Administrator of FAA, Mr. Barnabei represented Commerce for the period January to October 1959, while on FAA staff.

**Mr. Barnabei again became Department of Commerce Representative on June 3, 1960.

***For approximately six months prior to November 1, 1958, Mr. E. R. Quesada, Special Assistant to the President for Aviation, was a member of the Committee.

AGENCY OR OFFICE	1961	1962	1963	1964	1965
CHAIRMAN	W. E. Plummer (OCDM/OEP)	W. E. Plummer (OEP)	W. E. Plummer (OEP)	W. E. Plummer P.D. Miles (OEP)	P. D. Miles (OEP)
EXECUTIVE SECRETARY	P. D. Miles (OCDM/OEP)	P. D. Miles (OEP)	C. R. Kirkevold (OEP)	C. R. Kirkevold (OEP)	C. R. Kirkevold (OEP)
AGRICULTURE	E. C. Wagner	E. C. Wagner	E. C. Wagner	E. C. Wagner E. A. Loew	E. A. Loew
AIR FORCE	J. D. Flashman C. W. Loeber	C. W. Loeber S. Stearns	S. Stearns H. E. Fitch	H. E. Fitch J. P. West L. A. Buss J. D. Corley	J. D. Corley
ARMY	J. Clapper, Jr.	J. Clapper, Jr. G. L. Huffcutt	G. L. Huffcutt W. M. Van Harlingen, Jr D. R. Bodine N. White	N. White	N. White
COMMERCE	A. Barnabei	A. Barnabei	A. Barnabei	A. Barnabei	A. Barnabei
FAA	W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne
FCC (LIAISON)	W. H. Watkins	W. H. Watkins	W. H. Watkins	W. H. Watkins	W. H. Watkins
GSA	Became member September 4, 1964.			S. Schmalbach	S. Schmalbach
INTERIOR	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes
JUSTICE	L. G. Hailey	L. G. Hailey R. V. Colby	R. V. Colby	R. V. Colby E. J. Landreville	E. J. Landreville
NASA	J. B. McElroy	J. B. McElroy	J. B. McElroy	J. B. McElroy	J. B. McElroy
NAVY	L. R. Raish	L. R. Raish W. Dean, Jr.	W. Dean, Jr.	W. Dean, Jr.	W. Dean, Jr.
STATE	A. L. Lebel	A. L. Lebel C. W. Loeber	C. W. Loeber	C. W. Loeber	C. W. Loeber C. H. Price
TREASURY	J. L. Stewart	J. L. Stewart	J. L. Stewart	J. L. Stewart	J. L. Stewart
USIA	G. Jacobs	G. Jacobs	G. Jacobs	G. Jacobs	G. Jacobs

OR OFFICE	1966	1967	1968	1969	1970
CHAIRMAN	P. D. Miles (OEP)	P. D. Miles (OEP)	P. D. Miles (OEP)	P. D. Miles (OEP) W. Dean, Jr. (OEP)	W. Dean, Jr. (OEP)
EXECUTIVE SECRETARY	C. R. Kirkevold (OEP)	C. R. Kirkevold (OEP)	C. R. Kirkevold (OEP)	C. R. Kirkevold (OEP)	C. R. Kirkevold (OEP)
AGRICULTURE	E. A. Loew	E. A. Loew W. B. Morton	W. B. Morton	W. B. Morton	W. B. Morton
AIR FORCE	J. D. Corley	J. D. Corley	J. D. Corley J. E. Ogle	J. E. Ogle	J. E. Ogle R. H. Simmons
ARMY	N. White	N. White	N. White	N. White A. R. Rasmussen	A. R. Rasmussen
AEC*	G. E. Dodrill	G. E. Dodrill	G. E. Dodrill	G. E. Dodrill	G. E. Dodrill
COAST GUARD**		J. L. Stewart	J. L. Stewart	J. L. Stewart	J. L. Stewart
COMMERCE	A. Barnabei	A. Barnabei	A. Barnabei	A. Barnabei	A. Barnabei J. E. Ogle
FAA***	W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne	W. B. Hawthorne
FCC (LIAISON)	W. H. Watkins	W. H. Watkins S. M. Myers	S. M. Myers	S. M. Myers	S. M. Myers
GSA	S. Schmalbach	S. Schmalbach	S. Schmalbach	S. Schmalbach	S. Schmalbach H. H. Merkel
HEW	Became member September 8, 1970.				A. L. Horley
INTERIOR	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes	S. L. Windes
JUSTICE	E. J. Landreville	E. J. Landreville	E. J. Landreville	E. J. Landreville	E. J. Landreville
NASA	J. B. McElroy	J. B. McElroy	J. B. McElroy	J. B. McElroy	J. B. McElroy
NAVY	W. Dean, Jr.	W. Dean, Jr. V. G. Stingley	V. G. Stingley	V. G. Stingley	V. G. Stingley
STATE	C. H. Price	C. H. Price T. E. Nelson G. L. Huffcutt	G. L. Huffuctt	G. L. Huffcutt	G. L. Huffcutt
TREASURY	J. L. Stewart	J. L. Stewart H. R. Patterson	H. R. Patterson	H. R. Patterson	H. R. Patterson
USIA	G. Jacobs	G. Jacobs -	G. Jacobs	G. Jacobs	G. Jacobs

*Became member on August 26, 1966.
**Coast Guard was transferred from the Department of the Treasury to the Department of Transportation on April 1, 1967.
***The Federal Aviation Agency became the Federal Aviation Administration under the Department of Transportation on April 1, 1967.

AGENCY OR OFFICE	1971	1972			
CHAIRMAN	W. Dean, Jr. (OTP)	W. Dean, Jr. (OTP)			
EXECUTIVE SECRETARY	C. R. Kirkevold (DOC)	C. R. Kirkevold (DOC)			
AGRICULTURE	W. B. Morton	W. B. Morton			
AIR FORCE	R. H. Simmons	R. H. Simmons			
ARMY	A. R. Rasmussen	A. R. Rasmussen			
AEC	G. E. Dodrill	G. E. Dodrill			
COAST GUARD	J. L. Stewart	J. L. Stewart			
COMMERCE	J. E. Ogle	J. E. Ogle			
FAA	W. B. Hawthorne	W. B. Hawthorne			
FCC (LIAISON)	S. M. Myers	S. M. Myers			
GSA	H. H. Merkel	H. H. Merkel			
HEW	A. L. Horley	A. L. Horley			
INTERIOR	S. L. Windes	S. W. Windes			
JUSTICE	E. J. Landreville	E. J. Landreville			
NASA	J. B. McElroy	J. B. McElroy			
NAVY	V. G. Stingley	V. G. Stingley			
STATE	G. L. Huffcutt	G. L. Huffcutt			
TREASURY	H. R. Patterson	R. O. Myers			
USIA	G. Jacobs	G. Jacobs			

STATEMENT OF CLAY T. WHITEHEAD

AT

50TH ANNIVERSARY DINNER

OF THE

INTERDEPARTMENT RADIO ADVISORY COMMITTEE

JUNE 22, 1972

6/14/72

Paul -

Please see suggested changes on P. 5. Reason I plan to use some of this material as M.C.

Thanks,
Will Dean

The story goes that near the turn of the last century a high official in the Patent Office had reluctantly come to the conclusion that ~~all there was to be invented had been invented~~ nothing else could be invented. He ~~drew up a memorandum recommending the closure of the Office and his dismissal~~ wrote a memorandum in which he recommended that the Office be closed. Yet the ~~very~~ period between 1880 and 1905 ~~was richer~~ proved to be rich in new discoveries ~~than most other eras~~.

In the early 1880's, Heinrich Hertz was experimentally investigating the nature of electromagnetic waves. In ~~his~~ these experiments he developed an oscillator for generating high frequency electromagnetic energy. Essentially, this oscillator was the first radio transmitter. As today, however, a usable communication system required a receiver, so Hertz ~~developed~~ developing a detector ~~and~~ was able to detect transmissions at distances up to 25 feet by observing the spark across its gap.

On December 28, 1895, two brothers in Paris projected the first motion picture film; ~~on the first night~~ at its first showing only a handful of people watched the arrival of a train and a gardener getting wet. This was the beginning of the cinema. In Germany, a professor of physics, W. C. Roentgen, published a paper in 1895 on ~~what came to be known as~~ X-rays. In 1896, Henry Becquerel, Professor of Physics in the Polytechnic School in Paris, discovered that uranium ~~gave off~~ emitted another kind of ray. Thus ~~started~~ began a whole new science. Across the Atlantic Ocean in North Carolina, Orville Wright climbed into the pilot's position of his flyer ~~at 10:35 a.m. local time~~ on December 17, 1903. He was in the air for 12 seconds and covered a distance of 40 meters. Five people ~~came to watch as~~ watched the Kitty Hawk, but only there was very little public interest in flying ~~for several years~~ genuine at the time. experiment

~~At 12:30 p.m. local time~~ On December 12, 1901, another momentus event took place in an unused barracks hospital at Saint Johns, Newfoundland. The three dots of the Morse Code letter "S" ~~were heard by~~ heard Marconi and his assistant; signals across the Atlantic Ocean by wireless telegraphy on 328 kHz from Poldhu in Cornwall, England. Those were truly exciting times--because a few individuals "tried a little harder."

In 1903, the United States and eight other countries met in Berlin to conduct preliminary studies for the international regulation of radio. In ~~the~~ its final protocol ~~of this gathering~~, it was ~~laid down~~ determined that "coast stations shall be bound to receive and transmit telegrams originating from or destined for ships at sea without distinction as to the system of radio used by the latter." This principle became the basis for the international regulation of radio communications. By the time of the first Radio Conference in Berlin in 1906, a complete draft convention and radio regulations ~~were~~ had been considered by the twenty-nine attending nations. A ~~main work~~ significant part of this Conference, and of all subsequent radio conferences, was the treatment of technical questions, particularly those of frequency allocations. Two wavelengths for public correspondence and maritime services were established in the radio regulations at 500 and 1,000 kHz; frequencies below 188 kHz were reserved for long distance communications from coast stations, and the range between 188-500 kHz was reserved for "services not open to public correspondence, i.e. military and naval stations." The rhythmic distress signal "SOS," still in ~~being~~ existance today, ~~was~~ was also adopted at that Conference.

The Radio Act of 1912, which implemented ~~on a national level~~ the ~~international~~ agreements made in Berlin in 1903 and 1906, provided for an exclusion for Government radio stations and granted powers to the President for use in an emergency. The Wireless Act of 1919 ~~the~~ which was the first U.S. Federal statute controlling radio communications ~~,~~ made it mandatory that ships carrying 50 or more passengers be equipped with radio.

By 1922, the proliferation of radio operations exceeded the then available spectrum and rumors of "chaos and confusion" were rampant. The first National Radio Conference, ~~combining~~ comprising both Government and industry representatives, was held in Washington in 1922 to discuss regulation and control of the fast growing radio services. ~~and~~ On June 1, 1922, a special Government radio committee held its first meeting ~~with~~ attended ~~a~~ by representatives of Agriculture, Commerce, Navy, Post Office, State, Treasury, War, and the Office of the Chief Coordinator. This was the Interdepartment Radio Advisory Committee, ~~a body which has continued to the present~~. At ~~the~~ its first meeting, the committee agreed that Interior, Justice, Labor, and the Shipping Board should be asked to join.

I think it is interesting to note that the IRAC ~~came into being,~~ designated not as the result of action by either the Executive or Legislative Branches of the Government, but spontaneously through the demand of the interested Government agencies.

Since its founding, the committee has advised and reported directly to the President or his designated representative on spectrum matters. Today, the committee reports to me as Director, Telecommunications Policy.

The records of IRAC are replete with accomplishments. Time does not permit me to dwell on achievements, at length other than to note a few high points. The committee has served as a primary source in the development of U.S. positions for international conferences, notably the Atlantic City Conference of 1947, results of which were the foundation for post-war communications; the major World Administrative Radio Conference of 1959, which provided for the accommodation of new electronic devices such as improved radio navigation and radar systems; and the two milestone Space Conferences of 1963 and 1971. Thus, the IRAC was heavily involved in expansion and allocation of the spectrum above 30 MHz immediately following the war, to 40 GHz in 1959, and further expansion to 275 GHz in 1971. The committee was also in the thick of virtually all decisions bearing on the use of the spectrum, such as the growth of aviation needs; expanded post-war defense requirements; working with the Federal Communications Commission on the allocation of spectrum space for FM and TV broadcasting; and support of NASA in the space programs, to name a few. More-recent activities include; measures to implement the results of the 1971 World Administrative Radio Conference on Space Telecommunications; initiating planning for the 1974 Maritime Conference; and a continuous review of allocations to insure that the limited spectrum resources are used in the best national interest.

The annals of IRAC contain many famous names in radio. For example, I note that at the very first meeting of the Committee Dr. J. H. Dellinger of the Department of Commerce was in attendance. Dr. Dellinger, a noted

scientist, ~~nationally and internationally~~, was associated with the committee for many years and was an avid advocate of the advancement of radio. The famous "Dellinger Affect" in radio wave propagation bears his name. I've also noticed such names as Admiral S. C. Hooper, the father of naval radio and General Wesley T. Guest of the Department of the Army, ~~and Commodore E. M. Webster, the father of Coast Guard radio~~. The names of several FCC Commissioners also come to mind, for example, T. A. M. Craven, John Cross and E. K. Jett. I also must recognize Gerald Gross, who was Secretary of the Committee for many years and ultimately became Secretary-General of the ITU, ~~as well as Paul Miles, a long time participant in IRAC and the first chairman of the International Frequency Registration Board. Two other names stand out in the history of the Committee. In 1943, Mr. S. L. Windes became the representative of the Department of Interior and has held that position to the present time - nearly 30 years of dedicated service. A good friend of mine and a former associate, Bill Plummer, served the committee as the chairman from 1954 to 1964, the longest period for anyone to hold that position.~~

In reviewing the history of ~~the~~ IRAC, it is safe to say that the Committee's greatest contribution has been its cooperation and voluntary desire to do a good job in managing an important resource in the best interest of the nation. It is testimony to the ability of organizations such as ~~the~~ IRAC that the radio spectrum, sometimes called the sixth natural resource ~~as it is sometimes called~~, has been used in the United States in a unique manner when compared to the other resources of land, water, minerals, forest, and energy, wherein extensive efforts are now being expended

to rectify past errors regarding their conservation, protection, development and systematic use.

With respect to our other resources, studies indicate that unless remedial steps are taken we will run out of such metals as chromium, nickel, tungsten, copper, lead, zinc, tin and silver in the foreseeable future. If we are to continue to take advantage of the use of available metal resources, it is obvious that we must begin to recycle our metals completely, and this as soon as possible.

The matter of our oil reserves is equally alarming. At present the world's use of oil is about 45 million barrels per day or about 16 billion barrels per year. The known reserves are estimated to be of the order of 600 billion barrels, or enough for 37 more years at the current rate of use--and consumption has been doubling every 8 years. Unless we convert to other sources of power, such as nuclear, in the immediate future, the future generation is literally going to run out of gas.

~~Returning to the frequency resource,~~ One might observe today, as did our predecessors in 1912, that the spectrum is completely saturated and that we can look forward to confusion and chaos. However, I submit that we have only scratched the surface of our knowledge about and use of the electromagnetic spectrum. With man's exploration of the Moon and outer space, I foresee that one consequence might

be the accumulation of data revealing the nature of gravitation. This could permit the formulation of the unified field theory ~~which science has sought thus far in vain~~ thus far sought in vain. It would be a step in the understanding of the universe comparable with, and possibly surpassing, the great advances of Maxwell's theory of electromagnetic waves and Einstein's theory of relativity. The ability to receive electromagnetic radiations over the whole of the spectrum in contrast with the narrow spectrum ranges receivable through the earth's atmosphere would have profound consequences. ~~If one permits his mind to run freely~~ Permitting our minds to run freely we can foresee tremendous advances as we probe the entire spectrum as a means of expanding man's knowledge.

The spectrum is no longer, ~~and has not been for some time,~~ a resource which ~~could~~ can be treated on the basis of a 3 by 5 card record system. There has been an increasing awareness throughout the top levels of Government, the Congress, and the industry that increased attention must be given to the conservation and efficient use of the frequency resource. ~~Recognition of~~ The importance of the spectrum ~~at high levels~~ may be ~~gathered from~~ recognized in the statement of Admiral Thomas H. Moorer, Chairman of the Joint Chiefs of Staff, that if there were a World War III, the winner would be "the side that could best control and manage the electromagnetic spectrum."

As I look ahead into the future, I see one need ~~which stands out~~ above all others ~~as regards the spectrum~~--to be constantly striving to ensure that the ~~resource~~ spectrum is used in the best common good. In short,

the goal must be to recycle the cycle on a continuous basis. To attain this goal, four major objectives arise on which we should set our sights. First, there is an increased need for better engineering. The complex problems associated with the shoehorning in of new over-the-air communications-electronics applications can only be resolved on the basis of increased expertise in the fields of frequency assignment and allocation, electromagnetic compatibility analysis, and potential biological hazards. Engineering alone is not enough, and the second of our objectives should be to take into account more effectively social aspects in the use of the spectrum. Third, and closely akin to the second objective, I see the need for taking economic factors into account more thoroughly in our application and use of the resources. This is particularly important as regards the determination of alternatives to spectrum use. And last, we must be more acutely aware of the complexities and changing nature of the [illegible] of international affairs before which spectrum usage must be exercised.

These objectives can only be achieved if positive measures are taken now looking to the future. Specifically, we need young, highly qualified men of varying disciplines to be introduced into the pipeline. A survey shows that the majority of our most competent experts in this particular field, [illegible], will be eligible for greener pastures in the immediate future.

The needs for expertise are increasing rapidly while our capabilities are not keeping pace. For example, I am deeply impressed with the importance and potential of space telecommunications and the

need for the United States to play an increasingly important role in this area. I am concerned, however, that these days our successors find that within the Government in the early 70's there will not be a sufficient input of capable personnel to meet the negotiating demands of future international conferences. We must have qualified spokesmen "on the firing line" unless we are prepared to be less successful in future deliberations of the type recently undertaken at the 1971 World Administrative Radio Conference on Space Telecommunications. We need continued and improved coordination between Government and industry in developing our planning and international negotiations with respect to use of the spectrum. Our coordination mechanism with other nations must also be strong in this field and it is increasingly apparent that the ability of the United States to obtain its objectives in the international telecommunications forum will, to a significant degree, be directly proportional to the expertise which goes into preparation for and participation in international activities in the spectrum area. This point is very important in light of the ever growing number of administrations belonging to the international forum, each having one vote.

Heinrich Hertz once said, "These are the ultimate problems of physical science, the icy summits of its loftiest range. Shall we ever be permitted to set foot upon one of these summits, we know not; but we have found a starting point for further attempts which is a stage higher than any used before."

In its 50 years, the IRAC has faced the many challenges engendered by technological advances, and met them well. However well done the task

has been, now is not the time to rest on our laurels. New challenges to meet the future communication-electronics ~~requests~~ needs ~~in the rest of this century~~ are before us. The new dimension provided by the "space age" has added zest to the search for imaginative solutions. In these days of social change, communications-electronics has much to offer in the category of "doing things for people"--that is, contributing to making a better world ~~for people to live in~~ in which to live.

With the benefit of the advice from the current and future IRAC membership, ~~and noting the superb track record of the past~~, I look ~~to~~ forward to ~~and invite~~ these challenges with a secure feeling that the spectrum area will be well handled ~~even due to recycling the cycle with all this connotes in the process~~.

Tuesday 11/16/71 DINNER
6/22/72

3:00 Mr. Whitehead has accepted the invitation to the attend the 50th Anniversary dinner of the IRAC on June 22, 1972.

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

aee

October 22, 1971

To: Tom Whitehead
George Mansur
From: Will Dean

Subject: IRAC 50th Anniversary

June 22, 1972 will mark the Anniversary of the Interdepartment Radio Advisory Committee, formed by the Secretary of Commerce, Honorable Herbert H. Hoover, in 1922. Since that time the Committee has served as a focal point in the management of Government use of the radio spectrum.

The Committee feels that it would be appropriate to recognize the occasion in some way. Accordingly, on October 19, I met with several of the old timers, now retired (Plummer, Miles, etc.) to discuss the matter. It was agreed that the following areas would be pursued:

a. A short document -- to include highlights, recognize past Chairmen and Vice Chairmen and contain perhaps a Presidential statement.

b. Press Release -- I agreed to initiate this item.

c. Articles for Possible Inclusion in AFCEA/IEEE Publications.

Thursday
~~Tuesday~~
done 22?
ck with Tom

d. Anniversary Dinner -- Attendees to consist of all personnel who have participated in the activities of the Committee -- estimated attendance at least 300. It was also suggested that I explore the feasibility of the principal speaker being one C. T. Whitehead.

The foregoing is furnished for information and, hopefully, to obtain your concurrence to serve as an after dinner speaker.

Will

cc: Brian Lamb

Tom: will would like an answer to parts a-d, especially d.

Linda OK - like to keep in touch as it develops

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

October 22, 1971

To: Tom Whitehead
George Mansur

From: Will Dean

Subject: IRAC 50th Anniversary

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Thursday ~~Tuesday~~ June 22? CK with Tom OK

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Will

cc: Brian Lamb

1/1-72

Irace
6/22

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504
January 7, 1972

To: Tom Whitehead
Via: ~~George Mansur~~
From: Will Dean

Subject: IRAC 50th Anniversary

By memorandum of October 22 you were advised of preliminary planning on subject matter. On November 11, Linda Smith advised of your concurrence with the approach and desire to be kept informed of progress.

On January 6, I had another meeting with several of the old timers (Plummer, Barnabei, Wagner, White, etc...) with the following results:

(a) Documentation--An historical document has been prepared, reviewed and accepted for forwarding to the IRAC for final coordination. After the committee's review it will be passed to you together with a proposed Presidential statement for inclusion in the introduction. Mr. Plummer is nearing completion of an article for inclusion in the June issue of SIGNALS (AFCEA) Magazine. The target date for transmittal to AFCEA is mid-February. Another article is under development for inclusion in the IEEE Spectrum. The target date for this is similarly mid-February.

(b) Press Release--I will follow through on this matter.

(c) Anniversary Dinner--Agreement has been received for the dinner to be held at Bolling AFB Officer's Open Mess on June 22, 1972, at which time you are scheduled to be the principal speaker. I will prepare a suggested text for your consideration.

I will keep you posted on further developments as they transpire.

Will

cc: Brian Lamb
Linda Smith

OFFICE OF TELECOMMUNICATIONS POLICY

1-327

Log In No. _____

March 27, 1972

INFORMATION MEMORANDUM

To: Tom Whitehead

From: Will Dean

Brief Summary of the Material:

The attached reports on the status of planning for the observance of the 50th Anniversary of the IRAC. In short, plans are proceeding well and no difficulties are foreseen.

Why it is worthwhile to read:

You expressed a desire to be kept informed of progress in this regard. No need to read if you are satisfied with the above summary.

Will

ATTACHMENT

Form OTP 11
January 1972

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

March 27, 1972

To: Tom Whitehead
Via: George Mansur
From: W. Dean, Jr.

Subject: IRAC 50th Anniversary

By memoranda of October 22, 1971, and January 7, 1972, you were advised of planning on subject matter. You expressed a desire to be kept informed of progress in this regard.

On March 24, I had another meeting of the old timers (Plummer, Barnabei, Wagner, White, Miles, etc.) with the following results:

a. Documentation. An historical document has been prepared and forwarded to the White House, together with a proposed Presidential statement, for inclusion in the introduction. Expected return is the first week of April, after which printing will be effected. Mr. Plummer has prepared an article for inclusion in Signal's (AFCEA) magazine, to be the feature article in the May issue. Another article, prepared by Leo Buss, has been forwarded to IEEE for inclusion in IEEE Spectrum magazine.

b. Anniversary Dinner. Plans are well underway for use of Bolling AFB Officers Open Mess on June 22. Tickets have been printed, invitations will be issued on about May 1, and an attendance list of senior individuals throughout the Government has been prepared to whom invitations will be extended. I have prepared a suggested text for your delivery at the banquet and will submit it to you closer to the time of intended use.

In summary, I think we are in a go posture with respect to subject matter and will advise of any difficulties should they arise.

cc: Brian Lamb
Linda Smith

Tuesday 6/20/72

DINNER
6/22/72
7:30

10:00 As you may already know, the IRAC affairs will start at 6:30 for cocktails; dinner at 7:30 (they would like you to sit at the head table); and your speech would start at approximately 8:00.

Leave Blair House

OFFICE OF TELECOMMUNICATIONS POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C. 20504

May 22 , 1972

To: Tom Whitehead

From: Will Dean

Subject: IRAC 50th Anniversary

By memoranda of October 22, January 7, and March 27, you were advised of planning on subject matter.

The current status of developments in this regard is as follows:

a. Article by Bill Plummer was included in the May issue of SIGNALS (AFCEA magazine). Another article, prepared by Leo Buss, will be included in a forthcoming issue of IEEE Spectrum magazine.

b. Plans are proceeding satisfactorily for the Anniversary Banquet at Bolling AFB Officers Open Mess on June 22. Invitations have been extended to a long list of senior individuals throughout the Government. A proposed text for your delivery at the banquet as Keynote Speaker is set forth in Tab A.

c. An historical document, including the Presidential statement of April 17, has been prepared as set forth in Tab B. Copies of this documentation will be handed out in commemorating the occasion the night of the Anniversary Dinner.

d. A proposed press release is set forth in Tab C. It is recommended that it be issued on or about June 1.

Will
W. Dean, Jr.

Attachments

cc: Brian Lamb
Linda Smith

STATEMENT OF CLAY T. WHITEHEAD

AT

50TH ANNIVERSARY DINNER

OF THE

INTERDEPARTMENT RADIO ADVISORY COMMITTEE

JUNE 22, 1972

The story goes that near the turn of the last century a high official in the Patent Office had reluctantly come to the conclusion that all there was to be invented had been invented. He drew up a memorandum recommending the closure of the Office and his dismissal. Yet the very period between 1880 and 1905 was richer in new discoveries than most other eras.

In the early 1880's, Heinrich Hertz was experimentally investigating the nature of electromagnetic waves. In his experiments he developed an oscillator for generating high frequency electromagnetic energy. Essentially this oscillator was the first radio transmitter. As today, however, a usable communication system required a receiver, so Hertz developed a detector and was able to detect transmissions at distances up to 25 feet by observing the spark across its gap.

On December 28, 1895, two brothers in Paris projected the first motion picture film; on the first night only a handful of people watched the arrival of a train and a gardener getting wet. This was the beginning of the cinema. In Germany, a professor of physics, W. C. Roentgen, published a paper in 1895 on what came to be known as X-rays. In 1896, Henry Becquerel, Professor of Physics in the Polytechnic School in Paris, discovered that uranium gave off another kind of ray. Thus started a whole new science. Across the Atlantic Ocean in North Carolina, Orville Wright climbed into the pilot's position of his flyer at 10:35 a.m. local time on December 17, 1903; he was in the air for 12 seconds and covered a distance of 40 meters. Five people came to watch at Kitty Hawk, but there was very little public interest in flying for several years.

At 12:30 p.m. local time on December 12, 1901, another momentus event took place in an unused barracks hospital at Saint Johns, Newfoundland. The three dots of the Morse Code letter "S" were heard by Marconi and his assistant; signals across the Atlantic Ocean by wireless telegraphy on 328 kHz from Poldhu in Cornwall, England. Those were truly exciting times--because a few individuals "tried a little harder."

In 1903, the United States and eight other countries met in Berlin to conduct preliminary studies for the international regulation of radio. In the final protocol of this gathering, it was laid down that "coast stations shall be bound to receive and transmit telegrams originating from or destined for ships at sea without distinction as to the system of radio used by the latter." This principle became the basis for the international regulation of radio communications. By the time of the first Radio Conference in Berlin in 1906, a complete draft convention and radio regulations were considered by twenty-nine attending nations. A main work of this Conference, and of all subsequent radio conferences, was the treatment of technical questions, particularly those of frequency allocations. Two wavelengths for public correspondence and maritime services were established in the radio regulations at 500 and 1,000 kHz; frequencies below 188 kHz were reserved for long distance communications from coast stations, and the range between 188-500 kHz was reserved for "services not open to public correspondence, i.e. military and naval stations." The rhythmic distress signal still in being today, SOS, was also adopted at that Conference.

The Radio Act of 1912, which implemented on a national level the international agreements made in Berlin in 1903 and 1906, provided for an exclusion for Government radio stations and granted powers to the President for use in an emergency. The Wireless Act of 1919--the first U.S. Federal statute controlling radio communications--made it mandatory that ships carrying 50 or more passengers be equipped with radio.

By 1922, the proliferation of radio operations exceeded the then available spectrum and rumors of "chaos and confusion" were rampant. The first National Radio Conference, combining both Government and industry representatives, was held in Washington in 1922 to discuss regulation and control of the fast growing radio services and on June 1, 1922, a special Government radio committee held its first meeting with attendance by representatives of Agriculture, Commerce, Navy, Post Office, State, Treasury, War, and the Office of the Chief Coordinator. This was the Interdepartment Radio Advisory Committee, a body which has continued to the present. At the first meeting, the committee agreed that Interior, Justice, Labor, and the Shipping Board should be asked to join.

I think it is interesting to note that the IRAC came into being, not as the result of action by either the Executive or Legislative Branches of the Government, but spontaneously through the demand of the interested Government agencies.

Since its founding, the committee has advised and reported directly to the President or his designated representative on spectrum matters. Today, the committee reports to me as Director, Telecommunications Policy.

The records of IRAC are replete with accomplishments. Time does not permit one to dwell on achievements at length other than to note a few high points. The committee has served as a primary source in the development of U.S. positions for international conferences, notably the Atlantic City Conference of 1947, results of which were the foundation for post-war communications, the major World Administrative Radio Conference of 1959, which provided for the accommodation of new electronic devices such as improved radio navigation and radar systems, and the two milestone Space Conferences of 1963 and 1971. Thus, the IRAC was heavily involved in expansion and allocation of the spectrum above 30 MHz immediately following the war, to 40 GHz in 1959, and further expansion to 275 GHz in 1971. The committee was also in the thick of virtually all decisions bearing on the use of the spectrum, such as the growth of aviation needs, expanded post-war defense requirements, working with the Federal Communications Commission on the allocation of spectrum space for FM and TV broadcasting, and support of NASA in the space programs, to name a few. More recent activities include measures to implement the results of the 1971 World Administrative Radio Conference on Space Telecommunications, initiating planning for the 1974 Maritime Conference, and a continuous review of allocations to insure that the limited spectrum resources are used in the best national interest.

The annals of IRAC contain many famous names in radio. For example, I note that at the very first meeting of the Committee Dr. J. H. Dellinger of the Department of Commerce was in attendance. Dr. Dellinger, a noted

scientist, nationally and internationally, was associated with the committee for many years and was an avid advocate of the advancement of radio. The famous "Dellinger Affect" in radio wave propagation bears his name. I've also noticed such names as Admiral S. C. Hooper, the father of naval radio; General Wesley T. Guest of the Department of the Army; and Commodore E. M. Webster, the father of Coast Guard radio. The names of several FCC Commissioners also come to mind, for example, T. A. M. Craven, John Cross and E. K. Jett. I also must recognize Gerald Gross, who was Secretary of the Committee for many years and ultimately became Secretary-General of the ITU, as well as Paul Miles, a long time participant in IRAC and the first chairman of the International Frequency Registration Board. Two other names stand out in the history of the Committee. In 1943, Mr. S. L. Windes became the representative of the Department of Interior and has held that position to the present time--nearly 30 years of dedicated service. A good friend of mine and a former associate, Bill Plummer, served the committee as the chairman from 1954 to 1964, the longest period for anyone to hold that position.

In reviewing the history of the IRAC, it is safe to say that the Committee's greatest contribution has been its cooperation and voluntary desire to do a good job in managing an important resource in the best interest of the nation. It is testimony to the ability of organizations such as the IRAC that the radio spectrum, the sixth natural resource as it is sometimes called, has been used in the United States in a unique manner when compared to the other resources of land, water, minerals, forest, and energy, wherein extensive efforts are now being expended

to rectify past errors regarding their conservation, protection, development and systematic use.

With respect to our other resources, studies indicate that unless remedial steps are taken we will run out of such metals as chromium, nickel, tungsten, copper, lead, zinc, tin and silver in the foreseeable future. If we are to continue to take advantage of the use of available metal resources, it is obvious that we must begin to recycle our metals completely, and this as soon as possible.

The matter of our oil reserves is equally alarming. At present the world's use of oil is about 45 million barrels per day or about 16 barrels per year. The known reserves are estimated to be of the order of 600 billion barrels, or enough for 37 more years at the current rate of use--and consumption has been doubling every 8 years. Unless we convert to other sources of power, such as nuclear, in the immediate future, the future generation is literally going to run out of gas.

Returning to the frequency resource, one might say today, as did our predecessors in 1912, that the spectrum is completely saturated and we can only look forward to confusion and chaos. However, I submit that we have only scratched the surface as regards our knowledge about and use of the electromagnetic spectrum. With man's exploration of the Moon and outer space and our ability to explore and even visit many parts of the observable universe, I foresee that one consequence might

be the accumulation of data revealing the nature of gravitation. This could permit the formulation of the unified field theory which science has sought thus far in vain. It would be a step in the understanding of the universe comparable with, and possibly surpassing, the great advances of Maxwell's theory of electromagnetic waves and Einstein's theory of relativity. The ability to receive electromagnetic radiations over the whole of the spectrum in contrast with the narrow spectrum ranges receivable through the earth's atmosphere would have profound consequences. If one permits his mind to run freely we can foresee tremendous advances as we probe the entire spectrum as a means of expanding man's knowledge.

The spectrum is no longer, and has not been for some time, a resource which could be treated on the basis of a 3 by 5 card record system. There has been an increasing awareness throughout the top levels of Government, the Congress, and the industry that increased attention must be given to the conservation and efficient use of the frequency resource. Recognition of the importance of the spectrum at high levels may be gathered from the statement of Admiral Thomas H. Moorer, Chairman of the Joint Chiefs of Staff, that if there were a World War III, the winner would be "the side that could best control and manage the electromagnetic spectrum."

As I look ahead into the future, I see one need which stands out above all others as regards the spectrum--to be constantly striving to ensure that the resource is used in the best common good. In short,

the goal must be to recycle the cycle on a continuous basis. To attain this goal, four major objectives arise on which we should set our sights. First, there is an increased need for better engineering. The complex problems associated with the shoehorning in of new over-the-air communications-electronics applications can only be resolved on the basis of increased expertise in the fields of frequency assignment and allocation, electromagnetic compatibility analysis, and potential biological hazards. Engineering alone is not enough, and the second of our objectives should be to take into account more effectively social aspects in the use of the spectrum. Third, and closely akin to the second objective, I see the need for taking economic factors into account more thoroughly in our application and use of the resources. This is particularly important as regards the determination of alternatives to spectrum use. And last, we must be more acutely aware of the complexities and changing nature of the backdrop of international affairs before which spectrum usage must be exercised.

These objectives can only be achieved if positive measures are taken now looking to the future. Specifically, we need young, highly qualified men of varying disciplines to be introduced into the pipeline. A survey shows that the majority of our most competent experts in this particular field, so vital to the country, will be eligible for greener pastures in the immediate future.

The needs for expertise are increasing rapidly while our capabilities are not keeping pace. For example, I am deeply impressed with the importance and potential of space telecommunications and the

need for the United States to play an increasingly important role in this area. I am concerned, however, less our successors find that within the Government in the early 70's there was not a sufficient input of capable personnel to meet the negotiating demands of future international conferences. We must have qualified spokesmen "on the firing line" unless we are prepared to be less successful in future deliberations of the type recently undertaken at the 1971 World Administrative Radio Conference on Space Telecommunications. We need continued and improved coordination between Government and industry in developing our planning and international negotiations with respect to use of the spectrum. Our coordination mechanism with other nations must also be strong in this field and it is increasingly apparent that the ability of the United States to obtain its objectives in the international telecommunications forum will to a significant degree be directly proportional to the expertise which goes into preparation for and participation in international activities in the spectrum area. This point is very important in light of the ever growing number of administrations belonging to the international forum, each having one vote.

Heinrich Hertz once said,"These are the ultimate problems of physical science, the icy summits of its loftiest range. Shall we ever be permitted to set foot upon one of these summits, we know not; but we have found a starting point for further attempts which is a stage higher than any used before."

In its 50 years, the IRAC has faced the many challenges engendered by technological advances and met them well. However well done the task

has been, now is not the time to rest on our laurels. New challenges to meet the communication-electronics requests in the rest of this century are before us. The new dimension provided by the "space age" has added zest to the search for imaginative solutions. In these days of social change, communications-electronics has much to offer in the category of "doing things for people"--that is, contributing to making a better world for people to live in.

With the benefit of the advice from the current and future IRAC membership, and noting the superb track record of the past, I look to and invite these challenges with a secure feeling that the spectrum area will be well handled--even down to recycling the cycle with all this connotes in the process.

TEL-IRAC-72-30

OFFICE OF
TELECOMMUNICATIONS
POLICY

The Interdepartment Radio Advisory Committee

50 YEARS OF SERVICE

JUNE, 1972

PROPOSED PRESS RELEASE

50TH ANNIVERSARY OF THE INTERDEPARTMENT RADIO ADVISORY COMMITTEE

Director of Telecommunications Policy, Clay T. Whitehead, noted today that June 1972 marks the 50th Anniversary of the Interdepartment Radio Advisory Committee (IRAC).

In a short review of its history, Mr. Whitehead noted that the Committee was first established in June 1922, by the then Secretary of Commerce, Herbert Hoover, to advise him on radio spectrum matters. Effective management of the spectrum utilized by Government Departments and Agencies has thus long been recognized as essential to the communications and electronic services so vital to the activities of Government. When the present Communications Act was passed by the Congress in 1934, responsibility for radio spectrum usage by stations of the Federal Government was assigned to the President of the United States. Since that time, each President has retained the advisory services of the IRAC to assist with radio spectrum matters. By Executive Order of President Nixon, the Committee now reports directly to the Director of Telecommunications Policy, who has been delegated the authority to act on behalf of the President on radio spectrum matters.

Mr. Whitehead pointed out that the IRAC is made up of representatives from 16 Departments and Agencies of the Federal Government, major users of radio, and that the Committee is chaired by one of his Assistant Directors. He stated further that the advice provided by the IRAC has been of immeasurable value in the treatment of policy issues dealing with the allocation, management, and use of the spectrum. He also

noted that over the years the IRAC membership constitutes a long list of engineers, scientists, military officers, and administrators, many of whom have achieved distinction in their fields.

In recognition of the services provided by the IRAC over the past 50 years, President Nixon on April 17th sent the Committee a commendatory letter in recognition of its enduring contributions to the country's present day sophisticated communications and electronics capabilities. Mr. Whitehead advised that a booklet, containing the Presidential letter as its frontispiece, and commemorating the 50th Anniversary of the IRAC can be obtained upon request by contacting the Office of Telecommunications Policy Information Office at 395-4990.