PROFESSIONAL GROUP ON RADIO FREQUENCY INTERFERENCE

NEWSLETTER

NUMBER 6 JULY 1959

"Design unto others as you would they should design unto you"

per Sam Skolnik, PGRFI NY Seminar

Highlights of the New York Seminar; June 15, 1959:

New spec. 6181D should be out about August 1959.

New stabilization network curve and schematic. Can probably still use 6181B network, however.

Interference prediction is becoming of increasing importance.

Army estimates about 20,000 transmission elements in area of approximately 100 by 100 miles. Cannot predict all interference problems except by actual field experience.

Rapid search and measurement techniques badly needed.

Susceptibility to magnetic field now a major issue in equipment.

26,600 will go along with antenna at 3 feet instead of 1-foot. This spec. may eventually be consolidated with 6181D.

Attendance was - Unclassified 201, Classified 164.

RADIO FREQUENCY INTERFERENCE SEMINAR
June 15, 16, 1959

A two-day Radio Frequency Interference Seminar, sponsored by the IRE Professional Group of Radio Interference and the Air Research and Development Command of USAF, was held in New York on June 15 and 16. This seminar was attended by a total of over 250 radio interference engineers, together with representatives of Rome Air Development Center, Wright-Patterson Air Force Base, Bureau of Aeronautics, U.S. Navy, U.S. Army, Air Research and Development Command of the U.S. Air Force, and the Federal Communications Commission.

The first day was an unclassified session held at the Park Sheraton Hotel. The seminar Chairman, Mr. S. J. Burruano, of the Filtron Company, arranged for a most informative program which included a morning session of interference predictions. The afternoon session, with Mr. E. W. Chapin of the Federal Communications Commission as Moderator, had a national panel of interference measurement experts on the stage. The interference measurement forum started off with a brief talk by several of the panel members who provided information on the latest interference measurement techniques. The seminar was then opened to the floor for questions from the assembly. Members of the panel were: R. J. Farber of Hazeltine Research Corp., A. L. Albin of Filtron Company, L. B. Wilson of Sperry Gyroscope Company, R. B. Schulz of Armour Research Foundation, A. T. Parker of Stoddart Aircraft Radio Company, M. T. Harges of Empire Devices Products Corp. A. H. Sonnenschein of Polarad Electronics Corp., C. S. Vasaka of U.S. Naval Air Development Center, and S. Skolnik of Wright-Patterson Air Force Base.

The classified session of this seminar, held on June 16 at the Main Auditorium of the Albert Einstein College of Medicine and sponsored by the Air Research and Development Command of the U.S. Air Force, was the first classified seminar ever held on the subject of radio interference.

Mr. Leonard Milton, Executive Vice President of the Filtron Company and Vice Chairman of the Professional Group on Radio Frequency Interference, introduced the keynote speaker, Colonel C. H. Lewis, Director of Electronics, Headquarters, ARDC, Washington, D. C. Colonel Lewis, in a brilliant address on the subject of radio interference, brought out many of the problems of the Air Force due to radio interference and stressed the recommendation that radio interference be considered in the initial stages of design of all new weapon system programs. He also stressed the requirement that throughout the entire program, continued top level radio interference efforts be continued so as to provide a weapon system that can operate without malfunction in the electronic environment for which it was designed. He also stressed the fact that the electromagnetic spectrum is a natural resource and must be conserved and utilized carefully, because this natural resource has its physical limitations. Once we use it up or contaminate it with interference signals of all kinds, then it has limited usefulness.

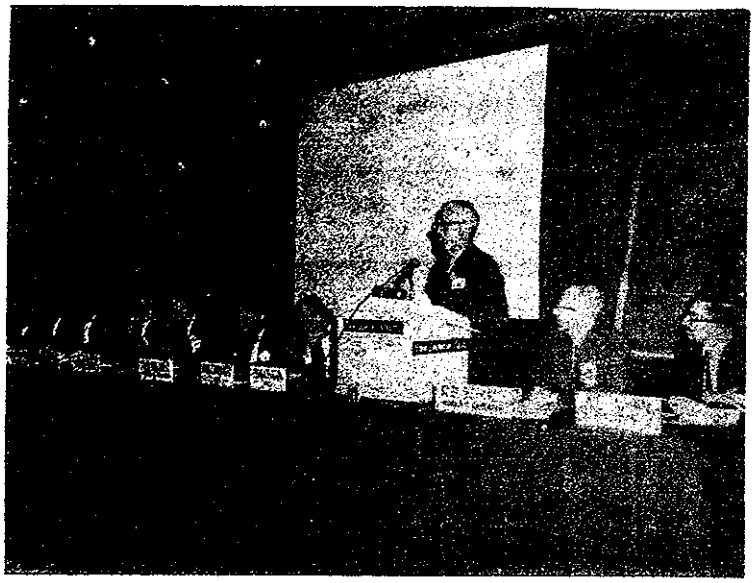
A paper entitled "Electromagnetic Interference Analysis and Control for Compatible Military Operation: was presented by Mr. Joseph Berliner of the Rome Air Development Center. Mr. A. L. Albin and Mr. Murray Gunar of the Filtron Company presented a paper entitled "Interference Analysis in the Ballistic Missile Early Warning System". Many new techniques and devices were shown on the screen and described in this paper which indicated that the state-of-the-art has been advanced.

A most comprehensive paper was presented by Mr. Leonard Milton, Executive Vice President of the Filtron Company, entitled "Methods of Signal Density Measurements". This paper, which was illustrated by over 50 colored photographs, described an electromagnetic radiation analysis that was taken of Thule Air Force Base and the Arctic vicinity by the Filtron Company last summer. Described were the methods of measurement. Shown were the radio interference vans, fully equipped for automatic measuring, and the data obtained and the calculations and analysis were presented.

Mr. E. R. Radford of the General Electric Company, Syracuse, presented an outstanding paper on "RF Power Density Evaluation and Measurements of AN/FPS-7 Radar System." Mr. Radford's paper was supplemented by over 40 photographs of the system. He described the methods, instrumentation, and results of the measurement program, together with an evaluation and analysis of the data.

Other outstanding papers were presented by Mr. W. B. Floyd and Mr. A. L. Fullerton, Jr., of Melpar, entitled "Interference Predictio Utilizing a Digital Computer", and Dr. H. A. Meyers of the Rand Corporation spoke on "Effects of Dense Radar Distributions in Receivers".

This classified symposium was attended by interference engineers and experts throughout the country, and was acknowledged by military interference experts as the most informative and technically up-to-dat of all the interference symposia held so far.



INTERFERENCE AUTHORITIES MEET AT
RADIO INTERFERENCE SEMINAR

Left to Right:

S. J. BURRUANO	-	Seminar Chairman
LEN MILTON	-	Executive V.P., Filtron Co., Inc.
Col. C.H. LEWIS	-	Director of Electronics, ARDC, USAF
SAM SKOLNIK	-	WADC - Systems Interference Control
WM. WEBB	-	WADC - Systems Interference Control
J. BERLINER	-	RADC - Systems Interference Control

Administrative Committee Meeting, March 23, 1959, Excerpts From:

Members present:
S. J. Burruano, R. W. Fairweather, Z. V. Grobowski, A. R. Kall, M. Kant, J. P. McNaul, Leonard Milton, W. E. Pakala, B. Schenker, R. M. Showers and Chairman Harold Schwenk.

Other PGRFI or IRE members:
L. G. Cumming (Technical Secretary, IRE), R. Daniels, C. L. Engleman, F. Kugler, O. P. Schreiber and C. S. Vasaka.

Committee Reports:
Membership Committee: R. W. Fairweather, Chairman
The Committee has been advised that there are in excess of 400 paid-up members. (March 31, 1959 figures were as follows: 469 paid-up members, 100 unpaid members and 3 student members.)

Treasurer's Report: Lt. J. P. McNaul. Treasurer

Balance as of 28 February 1959 is $2,119.03

Elections: (To take office on July 1, 1959)
Chairman: J. P. McNaul
Vice-Chairman: S. J. Burruano
Secretary: A. R. Kall
Treasurer: R. W. Fairweather

Administrative Committee:
To serve one year: Burruano, McNaul, Kall, Pakala, Schenker
To serve 2 years: Crichlow, Grobowski, Kant, Showers, Schwe
To serve 3 years: Schreiber, Daniels, Fairweather, Milton, Thomas.

Note: Anyone interested in having a copy of the Minutes of the Meeti should write to IRE Headquarters, 1 East 79th St., New York 21, N.

How a PGRFI Chapter was Formed:

A petition for a chapter of PGRFI was circulated in the Washingt Section during January and February of 1959. It accumulated a total 25 signatures, four of these were members of Fellow grade. On May 2nd it was submitted to the executive committee of the Washington Se tion for approval. It was approved immediately and forwarded to he quarters in New York for approval there.

In the meantime a mailing list of interested IRE members includ PGRFI members and non-members of IRE was compiled from variou sources. These people were invited to a meeting on March 5 to expl the interest and discuss future plans. H. E. Dinger gave an informa talk on the history of radio frequency interference work and Z. V. G bowski, Jansky & Bailey, Inc., told of the organization and aims of PGRFI. Twenty-one attended this meeting and expressed a keen inte est in forming a local chapter as a meeting ground for those engaged the interference field.

On April 3rd the secretary of the Washington Section was notifie that the IRE Executive Committee had approved the petition for a Wa ington Chapter. In May the PGRFI group participated in a meeting w the Washington Chapter of PGVC to hear a paper on interference.

Plans were laid to hold a meeting of PGRFI early in June so that officers could be elected to plan and carry out a program of activitie for the 1959-60 season. The chapter organizer appointed a nominatin committee to select a slate of candidates. At the same time an inter- esting program was arranged for a luncheon meeting set for June 10t C. F. W. Anderson of the Martin Co., Baltimore, was invited to spea on "Shortcomings of Interference Specifications." A panel of repres tatives from DOD agencies and the FCC responsible for interference specifications was selected. These representatives and their organi tions were as follows:

Mr. Leonard Thomas, Navy BuShips
Mr. Guy D. Johnson, Army Signal Corps
Maj. Claude C. Pinson, Air Force
Mr. Verne Gunsolley, Navy BuAir
Mr. Jules Deitz, FCC

This meeting drew an overflow attendance. Thirty-eight attende the luncheon and meeting and the discussion which lasted until 2:30 P. The discussion indicated a close interest in the problems concerned compliance and measurement under the military specifications. In general the shortcoming of the specifications as outlined by Mr. Ande son have or will be taken care of in new issues of these specifications It was pointed out that the problems of the airborne services are unli those of the sea and land based service in the limitations of size and weight and the close proximity or "togetherness" of the equipment. There was agreement that the lack of manpower and lack of funds hav had an arresting influence on the development of new techniques and t refinement of existing techniques to deal with radio frequency interfe ence.

In the report of the nominating committee, the chapter organizer James S. Hill, Jansky & Bailey, Inc., was selected for the office of chairman; Donald R. J. White, ACF Industries, vice chairman; and Aaron H. Sullivan, Jr., Engleman & Co., secretary-treasurer. The were no nominations from the floor and these nominees were unanimo ly elected to office. The future program of the Washington Chapter o

PGRFI and its 42 members is now in their hands.
(Editor's note: A Fort Worth, Texas, Chapter was formed on December 1, 1958. Petitions are now being circulated for a Chapter on Long Island, New York and in Philadelphia. More about these in our next issue.)

ITEMS OF INTEREST

PGVC Extends Invitation to PGRFI for Florida Meeting:

PGRFI members have been invited to attend the PGVC Symposium which is scheduled for December 3 & 4 at St. Petersburg, Florida. Those wishing to attend should get into touch with J.H. Mitchell, Box 1410, Tampa, Florida.

Low Level Signal Measurements:

The Right Angle, May 1959 issue, published by the Sanborn Company, Waltham 54, Mass., contains an article by Morton H. Levin, Senior Research Engineer, titled: Low Level Signal Measurements with the Model 350-1500 Basic Chopper Preamplifier. The first paragraph states:

"The measurement of low level signals is often complicated by excessive noise (particularly 60 cycles) due to ground loops. Proper isolation of the input circuit of an amplifier will allow microvolts of signal to be measured under these conditions. It will also allow the amplifier to be placed in the high side of a line for the purpose of measuring voltage drops across meter shunts. In addition, if the output circuitry is also isolated, ground loop problems with terminal equipment can also be avoided."

Bees Troubled by Short-Wave Signals:

The June 10, 1959 issue of the New York Times carried an article describing the troubles which a bee-fancier had with signals from overhead planes disturbing his bees. Excerpt from the article is as follows:

"With a short-wave radio apparatus, I could tune in on the signal from a passing plane to the ground. The bees would get nervous. The hive would start to hum.....I would put a lead screen over the hive and their nervousness would stop...."

Low Noise Input Circuits:

The National Research Council of Canada, Ottawa, Canada, has published a report, NRC No. 3662 titled: Low Noise Input Circuits, by A. C. Hudson. The Abstract states: The elementary theory of the design of amplifiers for best noise factor is reviewed. Cost 25¢ post paid.

Reduction and Prevention of UHF Interference:

Electronic Design, June 10, 1959, carries the following report:

"The origin and methods for reducing interference generated within UHF multichannel communication equipments such as the AN/ARC-27 are outlined in this report. The principal types of interference encountered were (1) intermodulation from the action of the nonlinearities in the early stages of the receiver and (2) spurious signal generation from the local spectrum-generator system. Nonlinearities considered were those found in the UHF amplifier tubes and first mixer tube. Title of report - Study Program for Investigation to Aid in Reduction and Prevention of UHF Interference, by Robert E. Meek, Howard L. McKinley and others, Georgia Inst. of Tech. Engineering Experiment Station, Atlanta, Nov. 56, 116pp, Microfilm $6.00, Photocopy $18.30. Order PB 135260 from Library of Congress, Washington 25, D. C."

Underground Radio Studied:

Electronic Design, June 10, 1959 carries a description of the Air Force's development of an underground communications system that would be almost invulnerable to enemy attack. "The advantages of the system? Protection from enemy attacks, negligible RFI, low vulnerbility to counter-measures and low over-all cost."

Woman's Radio Voice Explodes Missile:

Anita Ehrman, Hearst Headline Service, wrote the following article which appeared in Hearst papers, June 12, 1959:

"Was it a woman's voice on a short wave radio frequency which inadvertently exploded an American missile in outer space?

"This is the big mystery which puzzled U.S. scientists and was divulged by American delegates to a secret session of the UN outer space committee.

"According to UN informants, American delegates to the meeting astounded attending scientists by revealing to them that a human voice on a short wave frequency, can have the same effect on the behavior of an outer space missile as that of its assigned radio signal.

"After a U.S. missile had exploded prematurely after it was launched from its pad, an extensive investigation led to a taxi office in San Diego, Cal., which had short-wave communication operated on a frequency similar to that used for the missile.

"Experts concluded that the voice of a woman dispatcher in the office was so pitched as to be identical to the radio signal used to explode the missile in case of emergency and that, therefore, it was her instructions to a cab driver which caused the missile to explode.

"On the basis of this information, the UN scientists agreed in the secret session that urgent international attention should be given to protect radio frequencies used to transmit information between spacecraft and the earth"

Women, Birds - What Next?:

The UPI News Service distributed the following article for publication in May 15, 1959 papers:

"MOCKINGBIRD'S FUN SPOILED BY ELECTRONICS WIZARD

Dallas, Tex. (UPI)-Roger Harlan has given a mockingbird the bird and is finally keeping his electronically-controlled garage doors closed.

Harlan, an electronics whiz, fixed his garage door so that it would open when he honked his automobile horn or whistled.

So finely was the device tuned that neighbors couldn't whistle the door open.

But Harlan began finding the door open when he came home. He asked his wife to keep an eye on the garage.

A few days later she reported a mockingbird came daily.

It perched on a basketball hoop above the door and had a delightful time opening and closing the door by matching Harlan's whistle.

Harlan put in another circuit that has to be tripped four times in rapid succession before it operates the door.

For several days, the bird tried in vain to match the timing, then gave up and flew away.

The Solion:

Naval Research Reviews, May 1959, carries the following information on solion:

"A remarkable new electrochemical device that bids to replace the transistor in many electronic uses has been developed by the Naval Ordnance Laboratory. The device, called solion, is a product of a new technology developed by NOL called chemtronics, which involves the movement of ions in solution. The uniqueness of the solion is the way in which its electrical charge is carried - by ions in solution rather than by electronics, as in the vacuum tube and transistor.

"The most striking of the solion's characteristics is its extremely low power requirements, 100 to 1,000 times less than that for transistors. It is also highly sensitive to low-energy stimuli. Other features are inherent stability, long life, simplicity of operation, lightweight, and ease of manufacture.

"The Navy has devised several elemental types of solion units which can be combined for use as specialized transducers, very low frequency amplifiers, long period oscillators, and other devices."

Low-Frequency Magnetic Field Detector Based on Hall Effect:

Electrical Design News, June 1959, carries an article with the above title. The article states:

"A compact magnetic field detector for measuring low-frequency radio interference has been developed at the Armour Research Foundation of the Illinois Institute of Technology. The detector's pickup cell is of indium antimonide, a semiconductor. Using the Hall effect the

ell is responsive to the strength of the magnetic field rather than to ts time-rate-of-change as is a conventional loop pickup. Because of ts small size and uniform frequency response, the detector will make ossible more accurate field measurements. Developed for the U.S. lavy Bureau of Ships, the new detector will be useful in tracking down ow-frequency radio interference in the confined areas found in air-raft and ship communications equipment. Other applications are being nvestigated....."

This detector was described at the IRE National Convention, March 959, in a paper titled: Magnetic-Field Pickup for Low-Frequency adio-Interference Measuring Sets, by Max Epstein and Richard B. Schulz. Copies of this paper may be obtained by writing to the Armour Research Foundation.

Electromechanical Noise Generator:

Electrical Design News, June 1959, describes a Czechoslovak de-slopment as follows:

"An electromechanical noise-generator uses the random connec-ons between moving steel balls to generate low-frequency noise for stem testing. The generator is simple to construct and has suffici-nt output power (up to 1 watt) for most applications without the use of mplifiers.

"The generator consists of a stainless steel drum, about half lled with 5/64 inch steel balls, on a rotating shaft, a current source id a load resistor. The cylindrical portion of the drum is insulated om the shaft by plastic end-covers. As the drum rotates, the ran-om connections between the moving balls cause a varying resistance exist between the shaft and the outside surface of the drum. A cur-nt passed through this varying resistance generates a voltage in the ad resistor which has the random amplitude variations typical of hite noise....."

A schematic and picture of a unit are included.

New Process for Tin Plating Magnesium:

TIN NEWS, Washington, D.C., carries the following news item:

"A new process for tin plating magnesium to permit solderability s been developed by Brooks & Perkins. This process uses the ight advantages of magnesium for electric and electronic gear. Cop-r plating followed by tin plating, followed by dipping in oil at 450 de-ees F. fuses the tin and bridges over all microporosity in the copper. velopers claim the soldering can be conventionally performed and that is easier than on steel or copper"

Anybody who has had trouble with enclosures made of magnesium at have high interference sources in them will find that the above will ve them many headaches.

High-Altitude Nuclear Explosions and Interference:

The following, from the May 4, 1959 issue of Washington Science ends, gives about the most detailed unclassified information avail-le on the high-altitude nuclear explosions of August 1958.

High-Altitude Nuclear Explosions

Effects far transcending the much-publicized Argus series of nu-ar explosions in space resulted from Teak and Orange, the code nes for nuclear bombs detonated over Johnston Island in the Pacific August, 1958. In contrast to the Argus shots, Teak and Orange cau-d marked geomagnetic disturbances and extensive radio blackouts r thousands of square miles.

*Johnston Island detonations took place near midnight August 1 and 1958 at altitudes of roughly 12 to 25 miles. Explosive force, in the gaton range, was many times greater than the Argus experiments.

*Upper Atmosphere Effects - a new analysis by A.G. McNish of the tional Bureau of Standards indicates that the Teak and Orange explo-ns ionized the upper atmosphere at a distance of more than one thou-d miles to nearly daytime intensity. This resulted in electric cur-t flows that produced marked disturbances in the earth's magnetic ld lasting an hour or more. In contrast, the Argus experiments pro-ed no magnetic effects other than a few minor oscillations lasting but w seconds.

*Radio Communications Effects - Teak and Orange explosions "blacked out" all radio communications circuits over an area of several thousand square miles. Circuits were out of operation for a period of hours to and from Sydney, Australia - Wellington, New Zealand and Honolulu, Vancouver and San Francisco. Some circuits were impaired for a period of days. In contrast, the Argus experiments produced little or no communication difficulties, except perhaps in certain very low frequencies.

*Magnetic Field Changes - Analysis by Bureau of Standards indicates that magnetic field changes can be traced to primary and secondary gamma radiation from the Teak and Orange tests up to a distance of roughly 1,300 miles. Effects registered several hundred miles further away are attributed to charged particles from the detonation traveling along the lines of the earth's magnetic field toward a magnetic conjugate point. It was in this region that the first artificial auroras were sighted.

Teak and Orange also provided an opportunity to confirm geomagnetic theories which assume that the ionizing action of the sun's illumination produces electric currents which flow in the daylight but are virtually nonexistent at night. Magnetic effects at Honolulu and other points were reported to be nearly as large as if the lower layers of the ionosphere had been temporarily ionized to daytime intensity.

Stoddart Distributes Bulletin on Radiation Hazards:

The following Bulletin titled "Radiation Hazards in Radio Interference Measurement" has been distributed by Stoddart:

"1. Biological damage from exposure to intense RF radiation has been known for several years but only recently have quantitative limits been established.

2. A tri-service limit for exposure to RF radiation has been established at .01 watts/cm^2 at any frequency. This is 194 volts/meter assuming linearly polarized plane waves. General Electric has proposed that a maximum safe limit of .001 watts/cm^2 (61 volts/meter) be used for continuous exposure and that .01 watts/cm^2 be an absolute maximum not to be exceeded except under emergency conditions.

3. It is possible that personnel operating Stoddart equipment will be exposed to power densities greater than .01 watts/cm^2. This will probably occur in locations where the rf field will not be linearly polarized plane waves such as in the Fresnel Zone and in close proximity to magnetrons and klystrons.

4. It is suggested that before taking measurements near suspected or known strong radiation sources that reliable information on intensity be obtained.

Direct measurements of strong signal sources can be made with RI-FI equipment if the frequency is in the tuning range. Most RI-FI equipment does not have sufficient voltage range or shielding effectiveness to accurately measure to 194 volts/meter using standard antennas. In some situations, involving concentrated fields, the use of loop probes with their large antenna factors would enable approximate measurement. Limitations in RI-FI equipment shielding sometimes permits full scale meter indication when tuned to a very strong signal even with the antenna disconnected. Needless to say, the operator should be concerned when this occurs.

The following chart provides approximate equipment range limits (full scale) in volts/meter with and without pickup devices.

The equipment would be standardized for gain in accordance with instructions on the charts supplied. Then the input attenuator should be placed in the maximum position. Continuous wave signals would be measured in FI function switch position. Pulsed signals are measured with PEAK function.

Equipment	Antenna	Approximate field strength volts/meter
NM-10A	Half meter rod	2
	30" loop (90117-2)	10
	6" loop (90114-2)	100
	Loop probe (90185-1)	1000*
	No antenna (or cable)	100 to 200
NM-20B	41" rod (90291-2)	2
	Loop antenna (90298-2)	.1
	Loop probe (90185-2)	10*
	No antenna (or cable)	20

uipment	Antenna	Approximate field strength volts/meter
1-30A	Tuned dipole	1 to 50
	Loop antenna (90799-2)	170 to 500*
	No antenna (or cable)	10 to 500
1-50A	Tuned dipole	30 to 180
	No antenna (or cable)	100 to 180

aximum measurement shown using loop probe antenna is only prac-al if RI-FI equipment is not exposed to strong RF field."

orrections to MIL-I-26600:

We are indebted to Stoddart Aircraft Radio Company, Inc., for mitting the following letter from WADC to PGRFI Newsletter as a ans of our answering questions which have come in from other mem-rs.

Headquarters
WRIGHT AIR DEVELOPMENT CENTER
Air Research and Development Center
Wright-Patterson Air Force Base, Ohio
23 April 1959

UBJECT: MIL-I-26600
: Stoddart Aircraft Company, Incorporated
ATTN: Mr. A. T. Parker
6644 Santa Monica Boulevard
Hollywood 38, California

The purpose of this letter is to confirm the corrections to MIL-I-600 that were discussed on 22 April 1959. These corrections will be cluded in a revision to be issued soon.

a. Figure 5 The curve should start at 105 db at .150 mc.

b. Figure 7 The limit should be 60 db above 1 microvolt/meter.

c. Figure 9 The limit for pulsed cw radiated should be 80 db ve 1 microvolt/meter/megacycle.

d. Figure 12 The curve should be replaced by a curve defined the following points. A tolerance of ±20 percent is applicable.

f(Mc)	Ohms
.15	5.5
.2	8
.25	10
.3	11.5
.4	14.2
.5	16.5
.7	21
1	27
1.5	35
2	39.5
3	44
4	46
5	47
8	48.5
10	49
20	49
25	49

e. Figure 25 The 3 volts is an open circuit voltage and is sured across the secondary of the isolation transformer, while the sample and power source are disconnected.

f. Para 4.2.4 Delete last sentence.

g. Para 4.3.1.1 Delete "6-foot". Add: The insertion loss of les 6 feet long and under can be neglected; but on longer cables it st be considered.

h. Table I - Note 5 should not apply to the NM-50A in Category

i. In the frequency range from 1 to 10 KMC the measuring dis-e for radiated interference should be 3 feet. The directional an-a should be "aimed" for maximum pick-up. This includes polari-on adjustment.

j. Add new paragraph 6.12
RF Radiation Hazards. -

A tri-service limit for exposure to rf radiation has been es-ished at .01 watts/cm^2 at any frequency. It is possible to encounter even higher power densities than this established safe maximum limit during the tests required by this specification; however, these exceedingly high densities are usually localized. Power densities of .030 watts/cm^2 have been measured on equipment near tuning adjustments. Adequate safety precautions are recommended. This warning is intended to produce a healthy respect for rf radiation.

FOR THE COMMANDER:

H. G. Carter
Acting Chief, Interference Control Section
Identification and Data Conversion Branch
Comm and Nav Laboratory
Directorate of Laboratories

Copies may be obtained by writing Engineering Department, Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Boulevard, Hollywood 38, California, and asking for "Stoddart No. 40019".

Structural Bonding Described for Building Attenuation:

Engineering News-Record, April 2, 1959, carries an article titled "Structurals Play an Electrical Role in Transmitter Building". It has pictures and descriptive text describing the erection details of the concrete-enclosed, steel-framed building to house the most powerful radio transmitter in the U.S. It is at the Naval Radio Transmitting Station, Cutler, Maine.

Positive Control of the Electromagnetic Spectrum:

SIGNAL, monthly publication of the Armed Forces Communications and Electronics Association, carries in its May 1959 issue, an article under the above title. It is written by Col. J. D. Flashman, Chief, Frequency Allocation Group, Directorate of Communications-Electronics, Hqs. U.S. Air Force.

After giving an excellent explanation on the steps taken and problems encountered in trying to obtain positive control or protection of the spectrum, Col. Flashman concludes:

"In conclusion, it might be pointed out that as dramatic and successful as recent space activities may have been, their success has by no means been a foregone conclusion from a frequency usage standpoint. Success in the future cannot be assumed as long as there exists the element of calculated risk of electronic interference. The job now confronting us, therefore, is the elimination of all risk - in short, positive control."

Copies of the publication may be obtained by sending $1.00 to 1624 Eye Street N.W., Washington 6, D.C.

New Publication on Radio Signals:

The National Bureau of Standards announces a new publication on the theory of fading properties of a fluctuating signal imposed on a constant signal. The circular is a theoretical mathematical consideration of the varying strength of a radio signal consisting of two components - a constant signal and a fluctuating signal of the same frequency which has reached the receiver by a different path. Write to Government Printing Office, Circular 599, price 25¢

Radiation Hazards Discussed at GEEIA Headquarters:

Team leaders from each Ground Electronics Engineering Installation Agency recently met at Griffiss Air Force Base, Rome, N.Y. for a series of courses on radio frequency radiation hazards.

Difference between AC and DC Capacitors:

Sangamo Electric Company, Springfield, Illinois, is running an advertisement on technical topics of a specific interest to engineers. The June 1, 1959 issue of Electronic News has an advertisement titled "What is the difference between AC and DC capacitors?"

Radio Noise in Bombing Navigation System:

At the National Aeronautical Electronics Conference, Dayton, Ohio a paper was presented by C. H. Grace, Senior Engineer, IBM, Military Products, Owego, N. Y., on the methods of dealing

with radio noise problems in the design and construction of bombing navigation systems. The paper was published in the Conference Proceedings which are available from the Publications Committee, NAECON, P.O. Box 621, Far Hills Branch, Dayton 19, Ohio.

New Book on Electrical Safety:

ELECTRICAL SAFETY is a new book written by H. W. Swann, Senior Electrical Inspector for the British Home Office. The chapter on Static Electrification has information of value to those working in high ambient areas. It can be obtained from the Philosophical Library Inc., 15 East 40th., New York 16, for $15.00.

Noise Sources in Radio Receivers:

Electronic Design, April 29, 1959, carries the following resume of a report available from the Department of Commerce:

"Considered in this study were problems of standard noise sources in a radio receiver, calibration of secondary standards, and their use in measuring receiver noise factors-problems which are associated with the use of the receiver in radio astronomy where noise is the intelligence messured. A review of figure of merit concepts and receiver measuring practices using gas-discharge noise sources led to formulae which are said to reduce computations to simple additions of excess noise temperature and attenuations. Hot-body noise sources were used as standards in development and calibration of gas-discharge noise sources. Studies of calibrations and source design problems disclosed sources of errors, useful design features, and special techniques valuable for receiver measurements and calibrations. Fundamentals in Noise Source Calibrations at Microwave Frequencies, J.E. Sees, Naval Research Laboratory, Jan. 1958, 24 pp, $0.75 PB 131367 from OTS, U.S. Department of Commerce, Washington 25, D.C."

Detection of Aircraft by Radars Subjected to Interference:

Electronic Design, June 24, 1959, page 84 carries a report under the title of "Radio Interference" as follows:

"The purpose of this memorandum is to examine some of the consequences of radio interference for the operator. By knowing what these consequences are one can be prepared to understand the penalties for not adequately solving interference problems. The principal conclusion to be reached is that the penalties of letting an operator cope with the results of radio interference are sometimes much greater than design engineers recognize. 'Detection of Aircraft by Radars Subjected to Radio Interference', John D. Coakley, Dunlap and Associates, Inc., Stamford, Conn. May 1957, 18 pp, Microfilm $2.40, Photocopy $3.30. Order PB 135 736 from Library of Congress, Washington 25, D.C."

Measuring Resistor Noise:

Electronics, June 26, 1959, page 60 carries a two-column description of a method developed by the National Bureau of Standards to valuate the noise quality of fixed composition resistors. Two meters n the test set-up, one indicating average noise and one applied d-c, an read in db for readily computing an index of noise quality and conersion gain.

nterference from the Ionosphere:

Electronic Industries, March 1959, carries an article by Martin . Shapiro, Boeing Airplane Co., Lexington, Mass., under the above tle. The sub-title states: Skyward facing directional antennas are asy prey for ionospheric reflection interference. How to determine ie possibilities of subjection to this source is this article's objective.

oise Measurements up to 12,800 cycles:

A Germany publication, Frequenz, July 1958 contains a 5 page rticle on noise measurements. The article classifies the various noise ources in the frequency spectrum up to 12,800 cycles. Level of noise measured at various frequencies.

Common Positive" Electrolytic Capacitor:

The Syncro Corporation, Hicksville, Ohio, is publicizing a new ommon positive" electrolytic capacitor which should be of interest to ose engaged in interference problems. Catalogue No. CP59 bulletin describes this capacitor.

A Glossary of RF Terms:

Cannonade, published by Cannon Electric Co., in vol. XI, 1 Summer 1959, carries a glossary of RF terms which are definitio words basic to RF circuitry and are intended as an aid to the sele and use of radio-frequency circuit terminating devices.

MIL-I-6181B Testing Described:

Electromechanical Design, June 1959, as part of a series c articles on environmental testing, carries descriptive information testing to MIL-I-6181B and puts into Table form the design guides gested by that specification. (Too long to reprint in this Newslette

AND LAST BUT NOT LEAST

Armour Conference:

Be sure to put down on your calendar the dates October 6, 7 1959 which are those of the Armour Research Foundation Conferen in Chicago. A list of papers will probably be available for our nex Newsletter.

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