PROFESSIONAL GROUP ON RADIO FREQUENCY INTERFERENCE

NEWSLETTER

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Luncheon Address at Fourth Armour Conference:

AN OUTLOOK INTO THE FUTURE OF THE RF INTERFERENCE FIELD AND THE PART THAT THE PGRFI WILL PLAY IN THE FUTURE OF THE FIELD OF RF INTERFERENCE

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Gentlemen: I am honored to have this opportunity to speak about the Professional Group on Radio Frequency Interference, and I am pleased to see the number of people attending this Conference. This points out something very obvious and significant -- that there are a large number of people interested in the subject of radio interference reduction and electronic compatibility. However, there have been engineers who have asked me why the Professional Group on Radio Frequency Interference was formed. Perhaps before discussing the future of the RF interference field and the role that the PGRFI will play in it, I should like to retrospect and describe some of the events that led to the formation of this Group, and by doing so answer the question as to why the PGRFI was formed.

In the past decade, the electronics industry has grown tremendously. Along with this growth have come both great advances in technology and increased complexity in electronic devices. Also there was an increase in specialization. Hence the product engineer involved in a particular type of work had a difficult time keeping up with advances in his own specialty, without having to worry about "boiler plate" requirements that would have to be considered before his product could be delivered to the customer. One of the requirements that had to be considered was the control of RF interference. This job was left to a specialist, the RFI engineer. However, in the late forties and early fifties, there were not enough RFI engineers available to handle all the work that had to be accomplished. Inexperienced engineers had to be brought into the field, and trained. This was difficult since there was very little worthwhile information on RFI control available.

During this same period, the Government agencies were also becoming more interested in RFI control. The number of electronic equipments was growing each year and so was the RFI problem. To combat the growing menace of RFI, specifications were written specifying methods of measurement and limits that manufacturers would have to meet. Of course, these older specifications were far less complex than specifications written today. But they were very significant. First of all, it made people realize that there was a problem and that they should do something about it. Secondly, the specifications gave engineers limits to work to. However, these specifications were not easily met, and engineers working on RFI projects had to dig for information on RFI control. As time went on, RFI control became more difficult. Then someone realized that RFI control was easier and also less costly if it was taken into consideration in the beginning of a project. This philosophy was incorporated in recent years in specifications. MIL-I-006181C, which was superseded by MIL-I-26600, was one of the specifications that adopted this philosophy. This was accomplished by asking manufacturers to submit an RFI control plan within 90 days after being awarded a contract. What does this mean. It means that persons will have to think about RFI in the beginning of a project and that engineers with the most experience on RFI control will be called on to write the plan or at least be consulted on it. Obviously, the RFI engineer is the most logical person to write the plan. But in order to be an efficient RFI engineer, he must know the latest RFI control techniques. He obtains this knowledge through experience. RFI control, however, does not stop with a control plan. The project engineer, designer, and everyone else on the project has to carry out the plan until the equipment is in use. But unless all these persons are familiar wit RFI control, it is difficult, if not impossible, to make the plan a success.

There were a number of people and organizations that recogn zed the problem of dissemination of information on RFI control.

The first big move to disseminate information on RFI was made by the various Government agencies with the publication of sundry manuals on RFI control.

The second move was made by the Armour Research Foundat and the Government agencies that sponsored the First Conference o Radio Interference Reduction held in Chicago in 1954. In subseque years, other conferences were conducted by the Armour Research Foundation and in each case the purpose of the conference was to disseminate information on RFI by formal presentations and to give engineers the opportunity to exchange information in an informal manner with associates. This has worked out very well.

There were also symposia on RFI held by other organizations including I. R. E., the A. I. E. E., and the Department of the Army.

However, certain groups of engineers felt it would be better to form an organization devoted specifically to the subject of RFI control where information could be disseminated over the entire year rather than await these conferences. An organization was set up around 1956 on the West Coast and was called the Radio Interfer ence Technical Committee. Its main objectives were to (1) educate and exchange technical information on RFI, and (2) advance the science of RFI control.

Another group of engineers on the East Coast tried to form a organization similar to the RITC in 1956, but they were not succes ful. In 1957 at the Third Armour Conference, another attempt was made to organize a group. This time it was successful. However, during the period of organization, it was decided that it would be better to form a group that was international in scope. The I. R. E. Professional Group System fit into the scheme very well and a peti tion was sent to the I. R. E. On October 10, 1957 the PGRFI was officially established.

These are the reasons why the PGRFI was formed, and I thin it is obvious from what has been said that there was a very definite need for it.

Before I discuss what the PGRFI is hoping to accomplish, I would like to try to give some picture of what may be in store for RFI control engineers in the future.

First, I think that you will see RFI control becoming more of science. Present day methods of RFI control are in many cases based on trial and error. You will also see more accurate method of predicting levels of RFI and how an equipment will function in a particular environment before it is placed in the actual environmen You will see even more RFI control incorporated in the beginning o

a system design than was ever practiced before.

Obviously, the frequency spectrum now considered for RFI control will be inadequate in the future due to the increased number of equipments operating at the higher frequencies. This means that the RFI engineer will have to find methods of making these equipments compatible. Therefore, he will have to find methods of control and measurement techniques at the higher frequencies. In connection with these measurements, instrumentation will have to be developed and calibration of these instrumentation and measurement techniques will have to be standardized.

We are now entering the space age where the RFI control engineer will find himself with many new problems concerning telemetry, radio control of missiles, and mutual interference, as well as communications in outer space.

Hence today and probably even more so in the future, emphasis is to be placed on electronic countermeasures and counter-countermeasures. Since counter-countermeasures and the reduction of RFI incompatibility are so closely allied, I think that in the future you will find engineers in both of these fields working closely together.

Finally, I believe that there will be better dissemination of information on radio frequency interference.

These are some of the things that the RFI engineer might expect in the future. Now, how will the PGRFI fit into the future of the RF interference field? Naturally the PGRFI cannot engage in large research and development programs as a unit. But it can do other things. It can disseminate information. It can study problems in RFI and make recommendations, and by doing so serve both its members and society.

The Professional Group on Radio Frequency Interference is scientific, literary and educational in character. It also promotes close cooperation and exchange of technical information on RFI among its members by holding meetings, by publications, and through its committees' study, and provides for the needs of its members. As was previously mentioned, it was felt that dissemination of information should be on a continuing basis. This will be important in the future even more so than it was in the past because engineers, designers, and various others will want the latest information as soon as possible so that their jobs will be easier and less costly.

In order to accomplish this task the PGRFI has several committees. The Technical Papers Committee has the duty of studying the needs of the Group and procuring papers for Transactions, Proceedings and group meetings. To cover the needs of the entire Group, it has been decided to obtain technical papers on all phases of RFI and papers that will be useful to engineers with all types of backgrounds. In addition, you will find a variety of works ranging from tutorial articles to very highly technical and theoretical papers. In this way we can disseminate information to a large cross section.

In addition to the regular technical publications, we have a newsletter that gives the latest news on what's happening both in the Group and the field in general, as well as a very useful bibliography on articles recently written.

To further encourage the exchange of information, we have two important committees, the Meetings Committee and the Activity Committee.

The Meetings Committee arranges meetings like the ARF Conference we are attending today, where information may be obtained by means of formal presentations or by informal personal exchange of information with experts in the field.

Chapter Activities Committee, on the other hand, promotes the organization of chapters in the I.R.E. sections. The primary duty of a chapter is to promote section meetings in the field of interest of its associated professional group. Chapter meetings are technical in nature, and give an engineer the opportunity to obtain technical information on RFI and also exchange information on an informal basis at periodic meetings held locally. At the present time, we have one chapter in Fort Worth and three in the process of being organized in New York, Washington, and Detroit. We hope that within the next year there will be many more organized.

We also have another committee called the Technical Advisory Committee which should serve as a valuable sounding board in the RFI field of the future. This committee has the duty of studying the needs of the Group regarding such items as RFI specifications, measurement procedures, standards, and so forth, and will recommend to the proper authorities where further action is required

I have told you how the Professional Group on Radio Frequency Interference can fit into the future of the RF interference field. As you can see, the I.R.E. Professional Group on Radio Frequency Interference can play a very important role in the future of the field but it will require that we all lend a hand and work together if we are to be successful.

PGRFI Membership Increases:

The Membership Committee reported to the Administrative Committee, at its meeting on January 22, 1959, that there were 497 members of PGRFI on January 19, 1959. This is an increase of 192 members since the 15th of September 1958.

ITEMS OF INTEREST

Information about MIL-I-26600:

H. G. Carter, Acting Chief, Interference Control Section, Common Techniques and Test Support Branch, Comm. and Nav. Laboratory, WADC, Ohio, has very kindly answered a request for information on changes between MIL-I-006181C(USAF) and MIL-I-26600, as follows:

1. MIL-I-26600 is essentially the same as MIL-I-006181C (USAF). The changes are minor and were made to correct errors or to clarify a particular paragraph. The following paragraph numbers pertain to MIL-I-006181C(USAF):

	Paragraph	Changes
a.	3.5.3d	Delete.
b.	4.1.9.2	In last sentence; delete ------ since another, more satisfactory, measurement method is available. Substitute: ------ since another measurement method using a current probe is available.
c.	4.2.5.2	Add: In these cases where more than two power line stabilization networks are required, the above instructions shall be adhered to as closely as possible.
d.	4.3.3.1 4.3.3.2	Delete last sentence and substitute: Measurements above 1000 MC will not be required providing the contractor can furnish satisfactory evidence to the procuring activity that such measurements do not result in any significant data.
e.	4.3.4	6th line - change maximum to minimum.
f.	6.2.3.2 Table I 6.2.4	Delete all reference to Models 58S, 58AS and M-400.
g.	6.10	Delete and renumber following paragraphs

2. The following errors were inadvertently not corrected in MIL-I-26600: The numbers again refer to MIL-I-006181C(USAF).

	Paragraph	Changes
a.	4.1.3.1b	Delete Interference Level =

Meter Reading + Antenna Factor + Cable Loss
Impulse Bandwidth

and substitute

Interference Level =

(Meter Reading)(Antenna Factor)(Cable Loss)
Impulse Bandwidth

b. 4.2.5.2.1 In last sentence: ------- external leads should read ------- external loads.

c. Table I Note 6 should not apply to NM(50A) Ser No. 222-1 and higher.

New Book on Random Signals and Noise:

A new book titled: An Introduction to the Theory of Random Signals and Noise, by W. B. Davenport, Jr., and W. L. Root, has been brought out by McGraw-Hill Book Company, Inc., 392 pages, $10.00. This book presents the statistical theory underlying a study of signals and noises in communications systems. Problems follow each chapter. This is the first of the Lincoln Laboratory, Lexington, Mass., publications.

Principles and Applications of Random Noise Theory:

A new book, under the above title, has been written by Julius S. Bendat, Ramo-Wooldridge Corporation, and published by John Wiley & Sons, Inc., 431 pages, for $11.00. The text deals with problems of evaluating properties of random noise as these may affect understanding of physical phenomena and performance of complicated electronic control systems. It explains the basic ideas of random noise analysis and optimum filtering techniques. The author shows how to formulate certain difficult noise problems, derive their solutions, and obtain proper physical designs and interpretations. Included are discussions on probability theory, random noise analysis, random processes, engineering systems, correlation functions, power spectral density functions, and optimum filters, etc.

Interference to Color Television Reception:

An initial study of the possible causes, effects and cures of interference to color television reception has been compiled by the Washington, D. C. Television Interference Committee. A 14 page booklet has been published by Electronics Wholesalers, Inc., of Washington, D. C. and copies may be obtained by mailing 10 cents in postage to Harold R. Richman, Editor, Washington TVI Committee, 1110 Lake Boulevard, Annandale, Virginia.

Summary of Armour Conference, 1958:

Electronic Design, November 26, 1958, has a two-page summary of the high spots of the Fourth Conference on Radio Interference Reduction and Electronic Compatibility, Armour Research Foundation, 1958. A functional block diagram on an interference prediction system, described by J. Berliner, of RADC, is included. Also the high-lights of the papers by C. W. North, Leonard Thomas and William Jarva.

Microwave Interference and Susceptibility Measurements:

The July 1, 1958 issue of Instrumentation, a Journal of Creative Microwave Engineering, published by the Polarad Electronics Corporation, carries a four-page article on the above subject by Robert Saul and Joseph C. Shami. It describes the performing of radiated, conducted and susceptibility tests from 1000 mc to 10,000 mc. Most military specifications do not require measurements of conducted interference at microwave frequencies although some require measurements of susceptibility to conducted interference. Copies of the issue Vol. III, No. 1 may be obtained by writing to the Sales Department, 43-20 34th Street, Long Island City 1, New York.

A series of articles by Robert Saul titled: Measuring Microwave Interference appear in the October 15 and November 12, 1958 issues of Electronic Design. The second article suggests a means of controlling such interference (1) at the source of generation, (2) along the transmission path, and (3) in the susceptible instrument.

Measuring RF Power Between 10 mw and 10 w:

Electronic Design, December 10, 1958, pages 40 and 41, contains an article on this subject by B. P. Hand, Development Engineer at Hewlett-Packard. A circuit diagram of an rf power meter is shown.

Commutation Switch Developments:

An article which describes the basic sampling-switch considerations that instrument engineers must consider, and improvements in the state of the art that may be useful to systems design engineers, is in the August 1958 issue of Instruments and Automation. Dr. George P. Bentley and Sumner Ackerman, Instrument Development Laboratories, are the authors. Electrical noise, the article states, can be considered as being of three broad types:

1. Noise associated with high-impedance circuits.
2. Noise associated with low-impedance circuits.
3. Noise caused by thermal emf and contact bounce at make and break (independent of impedance).

Precision Wire Wound Potentiometer Performance Factors:

Electromechanical Design, December 1958, has over a column devoted to the different types of noise encountered in precision wire wound potentiometers as part of a study titled: Components Digest No. 2 (Precision Potentiometers). Types of noise discussed: Vibrational or microphonic noise, and residual noise - summarized as Loading Noise, Shorting Noise, Resolution Noise (winding curren and loading current); Generated Noise and High Velocity Noise.

Interference from Radar Modulators:

The following may be obtained from the Library of Congress, Washington 25, D. C. - Order PB 130459.

Title: Investigation of Interference from Radar Modulators Vol. II, Electromagnetic Shielding Principles. Rensselaer Polytechnic Institute, Research Division, Troy, New York, March 1956, 129 pp., microfilm $6.50, photocopy $19.80.

Volume II includes Volume I in table of contents and deals with electromagnetic leakage from coaxial cables, estimation of required shielding, conducted interference and appendices on leakage from long slits, derivation of the calibration factor for surface transfer impedance measuring equipment, construction of a pressure chamber for gasket tests, and variation of cabinet attenuation with door size.

New Amplifier Battles Noise at UHF and Microwave Frequencies:

Bell Telephone Laboratories is running a series of advertisements describing a new four-stage junction diode amplifier developed at Bell Telephone Laboratories by Rudolf Engelbrecht for military applications. It operates on the "varactor" principle, utilizing the variable capacitance of diodes. With 400 mc signal, the gain is 10 db over the 100 mc band. The development is in conjunction with U. S. Army Signal Corps contracts and the object was to reduce the "noise" in UHF and microwave receivers and thus increase their ability to pick up weak signals.

Electro-Interference and Missile Systems:

A two-page article, under the above title, appears in the October 1958 issue of The Engineers Bulletin, official monthly publication of the Colorado Society of Engineers, 936 Lincoln Street, Denver, Colorado. Mr. Vellar C. Plantz, Senior Engineer with Martin-Denver, is the author. The article is a general discussion of the importance of electro-interference in missile work and contains the following statement:

"It is not enough that specialists be developed. It is even more vital that an acute awareness of interference problems be instilled in the design engineer. By its very nature, electro-interference can be minimized in early design stages far easier and more economically than in finalized production equipment."

Copies of the Bulletin can be obtained for $.50 each.

England Cracks Down on Portable Radios in Aircraft:

Civil Aviation Information Circular No. 81/1958 of the Ministry of Transport and Civil Aviation, London, England, states:

"1. Experience has shown that fortuitous radiation by a passenger's portable radio (broadcast) receiver may cause interference to aircraft VHF radionavigation systems such as VOR and ILS. It is conceivable that this could impair the accuracy of navigation so as to hazard the safe operation of the aircraft in flight.

"2. Aircraft crews should be alert to this possibility and the person in command of the aircraft should, under the authority conferred by Rule 25 of Schedule II to the Air Navigation Order, 1954, take such appropriate action as may be necessary to prevent any such risk."

Broadband Radio Interference Generated by Airborne Electronic Devices Utilizing Diode Rectifiers:

A paper, under the above title, was given by J. C. Senn, Senior Electronics Engineer, CONVAIR (San Diego) at the 1958 Wescon IRE Convention. It is reprinted on page 25 of Part 5 of the 1958 Wescon Convention Proceedings.

Radio Noise Measurement:

Conducted and radiated interference measurements, instrument characteristics and response standards are reported in an article by Howard J. Tyzzer, Chief Engineer, Ferris Instrument Company, Boonton, New Jersey, in the November 1958 issue of Electrical Manufacturing. Such aspects of interference as Noise Sources, Measurement Standards, Time Constants, Proposed Time-Constant Standards, Calibration, etc. are covered. Requests for reprints should be addressed to the Ferris Instrument Company, Boonton, New Jersey.

New Book Describes Some Anti-Missile Devices:

In a book about World War II, titled - Walker R.N. and published by Pan Books Ltd., London, on page 135 is the following:

"Against the 'Chase-me-Charlies' there was no defence until, one day in the Bay, an escort was attacked by an aircraft which launched its 'glider bomb' just as a scientist aboard switched on his electric razor to test out a theory. To the amazement of the ship and the enemy aircraft, the new weapon gyrated about the sky in a fantastic exhibition of aerobatics, finally giving chase to its own 'parent'. In some inexplicable way, the 'Chase-me-Charlie' control system had been affected by the electric waves given off by the razor. This method was never officially admitted by the Admiralty as a defence measure, but the ships which sailed into the 'Chase-me-Charlie' areas found it fool-proof. In Liverpool there was a sudden run on shops selling all makes of electric razors."

Design of Enclosure Openings for Interference Reduction:

A six-page paper, with two charts from 0 to 10,000 megacycles, has been written by Arnold L. Albin, Senior Engineer, Filtron Co., Inc., under the above title. It is an amplification of the one-page article in Electronics, August 29, 1958 under the title - Designing Noisefree Enclosure Openings. Copies of this paper may be obtained by writing: Systems Engineering Division, Filtron Company, Inc., 131-15 Fowler Avenue, Flushing 55, New York.

Instrumentation Grounding Considerations:

DC Instrumentation System Grounding Considerations, Differential and Single Ended Amplifiers, by William G. Royce, is the title of Instrument Application Bulletin, Code No. 5-8 of KIN TEL, 5725 Kearney Villa Road, San Diego 12, California. Copies may be obtained from E. E. Cunningham, Manager, Instrument Sales. T opening paragraph is quoted below:

"Designers of data handling systems are constantly under pressure to provide higher and higher accuracies. As a result, manufacturers of transducers, amplifiers, and terminal equipmen have in recent years made tremendous advances in the state of the art. It is now almost commonplace to make measurements with overall accuracies approaching one-tenth of one percent. In the past, a major limitation to accuracy has been amplifier performar In particular, drift, gain accuracy, gain stability, and linearity ha been poor. These limitations are now overcome with modern DC amplifiers. However, in many applications, system noise arising from the use of long lines between transducer, amplifier, and load are setting the limitation upon resolution and accuracy. The grou loops caused by these lines, may, under worst conditons, result i noise levels a thousand times greater than the least signal. With proper grounding techniques, it may be possible to eliminate the noise. This paper presents a few of the more important grounding considerations, and, in addition, relative features of single-ended and differential amplifiers."

Suggest Use of Shielded Hangar for Aircraft Radio-Interference Tests:

Military Electronics, December 1958, carries a column digest of a paper titled Radio Interference Testing of a Completed Aircraft, by L. J. Cuff, E. B. Arrowsmith, and J. T. Gove of the Douglas Aircraft Co., Inc., El Segundo, California, and given before the Fifth Annual East Coast Conference on Aeronautical and Navigational Electronics, in Baltimore, Maryland. A quotation fr the paper is as follows: "As the size of the hangar is increased wi respect to an airplane of a given size, the greater will be the atten ation of reflected signals, assuming the airplane is to be centered the hangar."

A copy of the paper may be obtained by writing to Mr. J. T. Gove, Department B-250, Electrical Engineering, Douglas Aircraf Company, Inc., El Segundo, California.

Automatic Noise Figure Measurement:

The September, 1958, Proceedings of the IRE mentions on page 104A a talk given by H. C. Poulter, of the Hewlett-Packard Company, under the above title. Mr. Poulter states that the talk should appear in the Seventh Region Convention Record and that he working on a somewhat condensed version for publication.

The Mavar: A Low-Noise Microwave Amplifier:

Electronics, engineering issue, September 26, 1958, page 65 carries an article under the above title by Samuel Weber, Associat Editor. The sub-head describes the contents as follows: "In the quest for methods of low-noise amplification at microwave frequencies, the principles of parametric or reactance amplifiers are bein exploited in increasing measure. Investigation of these principles has resulted in the development of three major types of mavar whic rival the supercooled maser in low-noise performance. Unlike the maser, the mavar requires no cooling, is capable of wide bandwidt at substantial gain."

What Others Have To Say About Interference:

Electronic Industries, November 1958, page 5:

"Electromagnetic interference continues to be a vital problem in the national defense picture and, if anything, is worsening. The military complains that interference is not getting enough attention the design stages, that applying interference reduction measures after the equipment has been designed is 'truly the hard, inefficient, costly and often impossible way.'"

Electronic Design, January 7, 1959, page 28:

"RFI MAKES MISSILES MISS. An ever-rising flood of demanc to eliminate radio-frequency interference - demands from the Pentagon, from military installations, from systems manufacturers

is bringing into prominence one of the most glaring weaknesses in the design of electronic equipment. It is ranking in importance with reliability.

"To RFI is attributed such events as missile failures, blackouts of communication and radar contact, and submission of false information by computers. Far more important than the vast amount of money thus wasted is the dangerous disruption of defense facilities resulting from RFI signals.

"Recognizing the specific source or sources of RFI is the major problem confronting the design engineer if he is to bring the problem under control. Like a small brush fire, the cause must be stamped out before the situation gets out of hand.

"While conventional methods such as shielding and use of low-loss feedthrough components often reduce RFI, no universal set of rules can be presented. Individualized investigation of cases is required since factors such as operating frequency, power output, size and mode of operation tend to individualize equipment.

CHECK AT EACH STAGE

"Perhaps the most universally applicable prescription for controlling RFI is maintaining a close watch along the various stages of the engineering project and applying appropriate remedies as interference develops. If RFI is neglected until the equipment is in field use, brute force filtering may then require considerable increases in size and cost.

"Future designs must be devised with maximum freedom from spurious radiation. This will result in more reliable communication and data transmission, and a subsequent decrease in the number of headlines announcing missile and satellite failures."

Proceedings of the IRE, September 1958, Items of Interest in:

Noise In Maser Amplifiers - Theory and Experiment, by J. P. Gordon and L. D. White, Bell Telephone Laboratories, Inc., Murray Hill, New Jersey.

Error Probabilities for Binary Symmetric Ideal Reception Through Nonselective Slow Fading and Noise, by G. L. Turin, Hughes Research Laboratories, Culver City, California.

A Cathode Test Utilizing Noise Measurements, by W. Dahlke and F. Dlouhy, Communication of Telefunken Gmgh., Ulm, Germany.

A Low-Noise Nonlinear Reactance Traveling-Wave Amplifier - a letter by R. S. Engelbrecht, Bell Telephone Laboratories, Inc., Whippany, New Jersey, page 1655.

Co-Channel Television Interference and its Reduction, by E. W. Chapin, L. C. Middlekamp and W. K. Roberts. A reference is made to this paper as being in the IRE Transactions of the Professional Group on Broadcast Transmission Systems, June 1958.

The Effect of Noise Upon a Method of Frequency Measurement, by T. B. Pickard. A reference is made to this paper as being in the IRE Transactions of the Professional Group on Information Theory, June 1958.

Russian Translations:

Electronic Design, December 10, 1958, page 164, mentions the following paper: Title: Reduction of Interference Between Aerial Telephone-Telegraph Lines by Means of Feedback Networks, by M. A. Klimov, in Communications Journal (Vestnik Svyazi) 2/58, p. 10-12. The author considers the problem of reducing the interference between aerial telephone-telegraph lines with the aid of feedback circuits. It is indicated that it is possible to employ such networks to reduce interference between steel circuits used in VS-3 carrier systems.

Distortion and Interference Effects in HF Single Side-Band:

A paper, with the above title, was given at the IRE 1958 Canadian Convention by D. E. Gerrior, Collins Radio Company of Canada, Ltd.

Reprint Available from Library of Congress:

Title: Electromagnetic Radiation Patterns and Sources, by Claus Muller, New York University, July 1956, 10 pages, microfiln $1.80, photocopy $1.80. Order PB 127213 from Library of Congress, Washington 25, D. C. It is a reprint from an electromagneti wave theory symposium covering the following: 1. Waves, Electromagnetic - Radiation - Theory. 2. Antennas - Radiation patterns - Mathematical analysis.

Reduction of Low-Frequency Noise in Feedback Integrators:

Electronic Industries, January 1959, page 125, describes the above article, by E. M. Dunstan, in the Proceedings of the Institution of Electrical Engineers, England, November 1958, 13 pages. "Two methods of designing a feedback integrator for use with repetitive inputs are described. Each results in a considerable improvement in signal/noise ratio compared with that of a conventional direct-coupled integrator. The first method uses an error amplifier containing a single CR coupling. In the second, phase correction is applied to the output from a low-accuracy direct-coupled integrator, increasing the accuracy but retaining the relatively high signal/noise ratio of the low-accuracy integrator."

Performance of Some Radio Systems in the Presence of Thermal and Atmospheric Noise:

Electronic Industries, January 1959, page 127, describes the above paper by A. D. Watts, et al, in the Proceedings of the IRE, December 1958, 10 pages, as follows: "The performance of several basic types of communication systems are determined experimentally and in some cases theoretically, under typical conditions with steady and fading carriers, and in the presence of thermal or atmospheric noise. The relative efficiency of various carriers and the interference factor of various types of noise are found to be dependent upon the characteristics of the particular communication system as well as the characteristics of the carrier and noise themselves."

Translation from the Russian:

Electronic Design, January 21, 1959, page 120, mentions a Russian translation - Calculation of Internal Noise of Transistor Receivers, by V. V. Pavlov, RE 19/58, p. 30-37, 5 figs., 1 table. Text is summarized as follows: "After deriving expressions for the noise factors of grounded-collector, grounded-emitter, and grounded base circuits, the author reports test results obtained with various types of Russian and foreign transistors. A schematic of the test set-up is reproduced.

Interesting Article on Magnetic Storms:

John Brooks has written an interesting article on magnetic storms (due to sun spots) in the February 7, 1959 issue of The New Yorker, under the title: The Subtle Storm. After describing the effects of such storms on communications and on power lines, he includes the following:

". . . One of the most frightening potentialities of magnetic storms - only theoretical, to date - is that in wartime they could activate the fuses of magnetic mines, which are designed to explode when they come close to a ship made of, or carrying, large masses of magnetic metals, like steel or copper. Actually, none of the stron magnetic storms that occurred during the most recent war in which magnetic mines were widely used - the Second World War - are known to have caused such explosions, but if a nation were to begin lacing the earth's waters with magnetically triggered nuclear bombs, such storms would abruptly cease being the merely pesky curiosities they are now and would become a menace to the survival of the race."

Isolating Radar "Angels":

A new circuit, developed by MIT Lincoln Laboratory, South Truro, Mass., helps pinpoint sources of spurious radar echoes

commonly known as "Angels". The use of this circuit at a coastal location, over the past two years, has helped in the study of bird migration as well as clearing the ppi scope of bird echoes in order to improve the radar's ability to see aircraft.

Conclusions were reported at the Seventh Weather Radar Conference at Miami Beach by R. E. Richardson, J. M. Stacey, H. M. Kohler and F. R. Naka. More technical papers are being prepared for immediate publication.

Project SCORE May Solve Channel Jam:

Military Electronics, January 1959, discusses many of the papers given at the Second Global Communications Symposium held in St. Petersburg, Florida, in December 1958. Papers were given on satellite relaying of intelligence (SCORE); cables easing R-F spectrum squeeze, and inter-modulation in SSB equipment.

NEWSLETTER
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RADIO FREQUENCY INTERFERENCE
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