

## Section 5. Atmospheric Radio Noise

The study of atmospherics as a radio noise has been made extensively since the I. G. Y. and it has now become an important branch of researches at Toyokawa. Being recognized the importance of the research in this field, Section 5 was born in April, 1965. It is expected that the study of natural radio noises as possible sources of interference on radio-communication systems will be accelerated by reinforced staffs and increased budget.

So far, the study has been made both theoretically and experimentally on the property of atmospheric noise, wherein detailed structure of this noise has been measured in terms of the following parameters:- (1) amplitude probability distribution, (2) crossing rate distribution, (3) pulse-width distribution, (4) distribution of the spacing between pulses and (5) field strength of integrated atmospherics.

At present, at Toyokawa, we are measuring on a routine basis the atmospheric noise at 50 Kc/s with a vertical antenna and a receiver of 3-db-bandwidth 1 Kc/s, where the numbers of crossings at three different voltage levels of the atmospheric noise envelope are being measured at the output of the receiver for each several minutes at intervals of 20 minutes. In addition, the field strength of integrated atmospherics with a time constant of 80 seconds are being measured continuously at 50 and 100 Kc/s. We have a plan to measure the complete crossing-rate distributions at 5 different frequencies ranging from VLF to LF bands, and the apparatus for this purpose is now being prepared.

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### Publications (1963—65)

- (1) Nakai, T. : Calculated Statistical Characteristics of Atmospherics Radio Noise, Proc. Res. Inst. Atmospherics, Nagoya Univ., 10, 13 (1963)
- (2) Nakai, T. : Distributions of Pulse Duration in the Poisson Noise and Atmospheric Noise, i. b. i. d., 11, 19 (1964)
- (3) Nakai, T. : Feedback-Type Linear Detector, Electrical Engineering in Japan, 84, 3, 1 (1964)
- (4) Distribution of the Spacing between the Occurrence Times of Pulses in the Poisson Noise Process, Proc. Res. Inst. Atmospherics, Nagoya Univ., 12, 1 (1965)
- (5) Nakai, T. : Crossing Rate Distribution of the Atmospheric Noise Envelope, Jour. Inst. Elect. Comm. Engrs. Japan, 48, 4, 1 (1965)