

MORITA Kiyoshi

“Foundation of Ultra-High Frequency Engineering”

1. Biography

1901-3-10 Birth, 1921-3 Tokyo Technical High School, 1925 Doctor of Engineering, 1932 Professor of Tokyo Institute of Technology, 1960 Professor Emeritus of Tokyo Institute of Technology, and Chief Engineer at Oki Electric Industry Co., Ltd., honored the Order of the Rising Sun, Gold Rays with Neck Ribbon, 2005-12 Pass away (104 years old).



(MORITA Kiyoshi)

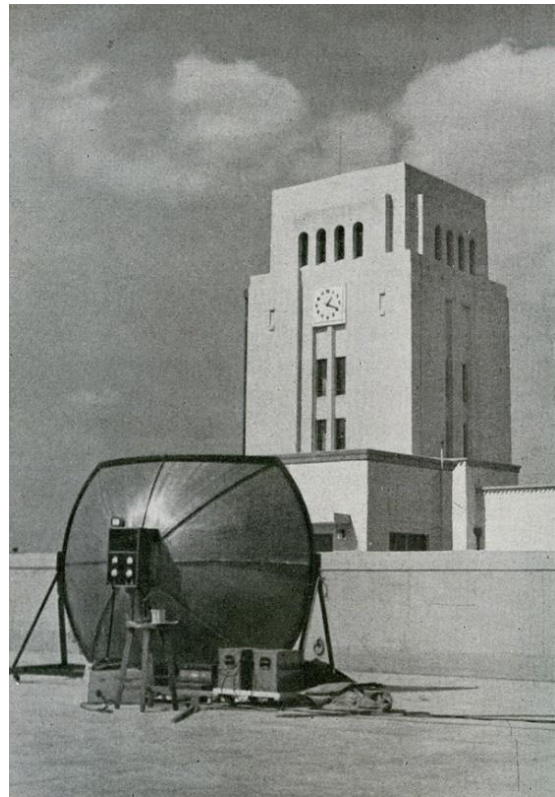
2. Summary

MORITA Kiyoshi achieved distinguished works, firstly in 1930s, succeeded the experiment of ultra-high frequency radio communication between the clock tower of the Tokyo Institute of Technology and the summit of Mount Tsukuba, across the Kanto Plain, secondly, invention and development of the magnetron with equalizer ring for stable generation of shorter microwaves, and thirdly, in 1950s, the development of microwave repeater system without power supply, and in addition, nurtured many excellent researchers.

3. Research Summary

3.1 Achievement of the Ultra High Frequency Radio Communication between the Tokyo Institute of Technology and the summit of Tsukuba Mountain

“In the June to July 1935, MORITA made the challenge of experiment of ultra-short radio wave communication at wavelength 68cm between the clock tower of Tokyo Institute of Technology and the summit of Tsukuba Mountain, across the Kanto Plain of 80km distance, by developing parabolic antenna as shown in Photograph 1, and the radio wave oscillator by the electron oscillation tube with output power of three watt. Telephone signal was sent from University clock tower with the radio wave power of 1-2 watts for



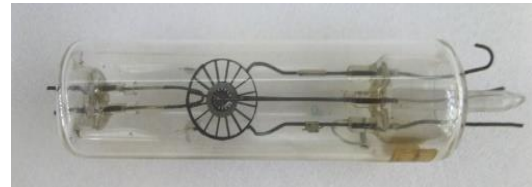
Photograph 1 Parabola Antenna used for the microwave transmission experiment between Tokyo Institute of Technology and Mount Tsukub. 1935. [1]p382.

telephone signal, and a super regeneration detector was used at the receiving end in Tsukuba, resulted in success to receive the fine telephone sound from loudspeaker. The parabolic disc with diameter of 2.5m with flat top and bottom for handy use was employed.

As it was a line-of-sight direct transmission, it was quite stable without external noise”, as written by Morita in p382 of reference [1]. This experiment inspired industry as well young researchers.

3.2 Invention and development of Magnetron with stabilizer ring

He invented and developed, in 1937, the Magnetron with stabilizer ring intended for shorter wavelength generation at microwaves, as shown in Photograph 2, together with NISHIMAKI Masao (later professor emeritus). ([1] pp231 ~232).



Photograph 2 Magnetron with stabilizer ring. 1936. [1] p81, Courtesy of Museum of Tokyo Institute of Technology.

3.3 Invention of Microwave Repeater without Power Supply

In 1952, the microwave repeater system without power supply was invented to meet the request from Tohoku

Power Company to connect between a hydic power plant in the bottom of valley and an office in the city. Two $4 \times 4 \text{m}^2$ plane reflectors placed on top of the mountain to sharp change of wave propagation, together with SUETAKE Kunihiro (later Professor Emeritus) and SEKIGUCHI Toshio (later Dean of engineering) , and in cooperation with NEC. Invention of this repeater system was used at many hydroelectric power plants located at mountain area. ([2] p82).

4. Remarks

Kiyoshi MORITA was great researcher as well teacher. Challenging spirit of MORITA had inspired young students, and many researchers were nurtured under his school. It was his encouragements, with which his students including the author himself never forget, that “you should be in success if you insist your goal ever”. Both of his book ”Ultra Short Wavelength Technology” (1941) and “Information and Prediction” (1970) were honored distinguished book from the Institute of Electrical Engineering of Japan and the Institute of Electronics, Information and Communication Engineers, respectively.

5. References

- [1] MORITA Kiyoshi , ” Ultra Shot Wavelength Technology, Revised,” Kyousyuh Syoin Inc.,1944—3.
- [2] “History of Tokyo Institute of Technology,” Centenary Anniversary of Tokyo Institute of Technology, Kuramae Kougyoukai, 1995—7.

(2021-2-8 SUEMATSU Yasuharu presented)