

Contributions of late Professor Edward Morton Kennaugh (1921 – 1963) to “Radar Polarimetry” – theory and applications

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Abstract

The Electrical Engineering profession and the electromagnetics discipline lost a great luminary and teacher with the death of Professor Edward M. Kennaugh at age 60 on March 11, 1983. Beyond the borders of the campus of his alma mater and that of the USA he became known and highly admired, specifically through his contributions to NATO Advanced Study Institutes and AGARD Workshops. Here we are gathering twenty years later honoring the contributions of this visionary – one of the greatest scientists of the past century who influenced most profoundly the progress made in electromagnetic imaging, antenna theory and practice until this very day

Coming to the Ohio State University in 1946 he stayed as a graduate student under Professor Victor Rumsey, and labored for 35 years on electromagnetic scattering theory, bringing international fame to himself and honor to the Electro-Science Laboratory in which he worked. His fundamental theory of the polarizing properties of radar scatterers, accomplished in the early 1950's while he was still a student, remains today the definitive work on this subject. His introduction in 1948 of the “*Impulse Response*” concept for three-dimensional scattering obstacles brought new importance to the time-domain viewpoint in scattering theory and opened avenues of research which continue to branch even today. The large body of literature, which has been built upon this one concept, is overwhelming witness to the depth of Professor Kennaugh's insight into the scattering process. For twenty years, he and his students labored to refine the theory and contribute to this literature while proceeding to develop basic ideas in other directions. In the early 1960's he laid the foundations of antenna scattering theory and called attention to the importance of antennas in the modification and control of radar scattering. This work was in advance of its time and came to be widely appreciated only with the advent of low cross section aircraft. In the middle 1960's he inspired and fostered the development of modal descriptions of scattering by obstacles of arbitrary shape. In this fundamental work he displayed his genius for seeing common things in an uncommon way by bringing together the familiar ideas of power factor and eigenvectors, a union which continues to bear fruit even today. In the early 1970's, Professor Kennaugh took on the directorship of the Electro-Science Laboratory and remained at that post for three years while continuing his researches in scattering theory. His “retirement” in 1977 was one in name and not in fact, for he proceeded in the six years given to him since then to develop the so-called “*K-pulse*” concept which he formally introduced in 1981 and he was carrying forward at the time of his death. This concept crowns Professor Kennaugh's years of research in time-domain methods and, with its singular originator now gone, its development remains a formidable challenge to present and future investigators.

Here, in this overview and session mainly the fundamental contributions to “*Radar Polarimetry*” of this extraordinary luminary will be addressed.

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