

**Philip Woodward, Expert in Radar Measurement, to Receive  
2009 IEEE Dennis J. Picard Medal for Radar Technologies and Applications**

*Work Has Profoundly Influenced Accuracy of Radar Signal Analysis*

**PISCATAWAY, N.J. – 22 June 2009** Philip Woodward, a mathematician and engineer whose novel approach to evaluating ambiguities in radar signals became the standard for radar signal analysis, is being honored by IEEE with the 2009 IEEE Dennis J. Picard Medal for Radar Technologies and Applications. IEEE is the world's largest technical professional association.

The medal, sponsored by Raytheon Company, recognizes Woodward for pioneering work of fundamental importance in radar waveform design, including the Woodward Ambiguity Function, the standard tool for waveform and matched filter analysis. Woodward will be recognized for these contributions at the IEEE Honors Ceremony in Los Angeles, Calif. on 25 June 2009. For the first time, the IEEE Honors Ceremony will be broadcast live on the Web through IEEE.tv ([www.ieee.tv](http://www.ieee.tv)).

Woodward applied probability and statistics to recovering data from noisy samples, eliminating everything but the desired information from the radar echoes. He concentrated on optimizing the information content at a time when the focus was on maximizing the electrical strength of the wanted signal by comparison with that of the background noise. He is considered to have been "many years ahead of his time" in using Bayesian probability when its use was scorned by conventional statisticians. This is now a standard technique in the fields of cryptanalysis and pattern recognition.

What would become known as the Woodward Ambiguity Function provided the foundation for the development of complex waveforms in modern radars and for the description of radar resolution and accuracy. It was able to show graphically how range and velocity accuracy could be traced, how spurious responses appear in both dimensions and the limitations governing the process. Given computing power unavailable when it was first formulated, the ambiguity formula has enabled system designers to assess the capacity of a complex radar transmission to detect the range and radial velocity of a target and to define the optimum detection strategy.

In addition to his contributions to radar technology, Woodward was responsible for one of the United Kingdom's first electronic computers and its first solid-state computer. He also led the software team that developed the first high-level programming language for

small military computers in the British armed services. After retiring from government service, he designed and made a pendulum clock in 1984 that is considered the nearest approach to perfection by a mechanical timekeeper not using a vacuum chamber.

In 2005, Woodward received the first-ever Lifetime Achievement Medal from the U.K. Royal Academy of Engineering. Other honors include a special merit appointment in the British Ministry of Defence, a doctorate of science from Oxford University, a Heaviside Premium from the Institution of Electrical Engineering, and the Barrett Silver Medal of the British Horological Institute. His book, "Probability and Information Theory, with Applications to Radar" (Pergamon Press, 1953), is considered a classic in the field and provided much of the basis for subsequent theory of radar measurement. Woodward received his master's degree from Oxford University, United Kingdom. He retired in 1980 as a deputy chief scientific officer from the Royal Radar Establishment, where he began working in 1940.

#### About IEEE

IEEE, the world's largest technical professional society, is commemorating its 125<sup>th</sup> anniversary in 2009 by Celebrating 125 Years of Engineering the Future around the globe. Through its more than 375,000 members in 160 countries, IEEE is a leading authority on a wide variety of areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics. Dedicated to the advancement of technology, IEEE publishes 30 percent of the world's literature in the electrical and electronics engineering and computer science fields, and has developed nearly 900 active industry standards. The organization annually sponsors more than 900 conferences worldwide. Additional information about IEEE can be found at HYPERLINK "http://www.ieee.org" <http://www.ieee.org>.