



Dept. of Electrical and Computer Engineering

Colloquium

Integrated Intelligent Sensing

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Remote sensing is a part of everyday life providing sources of information on scales spanning the global to the local. As human beings we are fully at ease with using a multiplicity of sensors to interpret and influence the world in which we live. Synthetic sensors, such as radar systems, have tended to operate in isolation, viewing the world in a relatively fixed and simplistic way. If their true potential is to be realized it will be via integration of multiple sensors, exploitation of diversity space and the introduction of intelligent or cognitive processing. Subsequently remote sensing will experience massive and fundamental change. Phased arrays have already highlighted the need for intelligence in future systems. Diversity (spatial and temporal) offers hitherto unexplored design freedoms, enhanced performance of existing systems and new applications. This places an even greater need for automatic and intelligent interpretation of the sensed information if their potential is to be fully realized. This applies equally well to other forms of sensing which may be thought of as yet another further form of diversity. The combination of intelligence and diversity forms the basis of this presentation. The concept of intelligence in RF sensors is examined to show that it is a mandatory part of future sensing systems. Subsequently, some examples of how intelligence may be usefully introduced are given. Natural echo locating systems also offer clues as to how impart intelligence into synthetic sensors. The operation of the mammalian bat is examined and compared with current radar systems to show that many degrees of freedom and diversity exist that have yet to be exploited. This may offer a route to a capability that is far superior to anything currently existing. This is probed further using the particular example of automatic target recognition performance can be enhanced.



Chris Baker is the Dean of the College of Engineering and Computer Science at the Australian National University (ANU). Prior to this he held the Thales-Royal Academy of Engineering Chair of intelligent radar systems based at University College London. He has been actively engaged in radar system research since 1984 and is the author of over one hundred and fifty publications. His research interests include, Coherent radar techniques, radar signal processing, radar signal interpretation, Electronically scanned radar systems, natural echo locating systems and radar imaging. He is the recipient of the IEE Mountbatten premium (twice), the IEE Institute premium and is a fellow of the IEE. He is also currently chairman of the IEE Radar, Sonar and Navigation systems professional network. He is a visiting Professor at the University of Cape Town, Cranfield University, University College London and Adelaide University.

Host: Philip Schniter