

Biography - Dr. Marshall Greenspan, Senior Consulting Systems Engineer; Northrop Grumman Corporation



Education/Accomplishments: Dr. Marshall Greenspan has nearly 50 years of experience in the design, development, and testing of advanced technology military airborne radar systems. Since graduating with his Bachelor and Master Degrees in Electrical Engineering from the Massachusetts Institute of Technology in 1962 and receiving his PhD degree in EE from the University of Connecticut in 1969, Dr. Greenspan has witnessed the evolution of modern radars from what was initially simply a navigational aid to overcome the errors in open loop inertial navigation systems and pilot vision limitations under night or adverse weather flight conditions into what is today primarily a device to find objects that are not found in Google maps, or satellite-based imagery. Such objects of interest to today's radars include small aircraft and missiles, surface and near-surface

watercraft, land vehicles, and even people moving in restricted or inaccessible areas of interest. This emphasis on detecting, identifying, and precision-locating small objects at long ranges has placed severe demands on the radar sensor. These demands directly affect the selection of suitable radio frequency bands that can efficiently propagate through the intervening path between the radar and the area of interest with minimum signal distortion. They also define the total amount of RF power that must be radiated into the area of interest to overcome the inevitable absorption and scattering of the radiated energy and, additionally, they define both the temporal and spectral distribution of this radiated energy to provide the information needed to reliably detect, identify, and ultimately precision locate the object of interest that, in most tactically-significant situations, is well camouflaged or otherwise hidden in its background clutter environment.

Dr. Greenspan began his radar engineering career in the early 1970's in the design and development of the navigation, targeting, and terrain avoidance radar in the Navy's carrier-based A-6 Intruder aircraft designed to fly undetected at very low altitudes for great distances under night and all weather flight conditions, find its target, and return safely to its carrier. In the early 1980's, this radar was upgraded to generate high resolution images of the area contained within the radar beam along with markers to pinpoint the location of any moving targets found within this ground image scene. This revolutionary technology was adapted by the Defense Advanced Research Projects Agency (DARPA) and the US Air Force in a competitive flight demonstration program named Pave Mover that put a side-looking radar in the bomb-bay of a high speed EF-111 aircraft to detect and track armored surface vehicles at long range while simultaneously guiding precision munitions to an final target intercept. This technology eventually became part of the Air Force/Army Joint STARS system that went into full scale development and was successfully deployed in several mid-East conflict areas. Most recently, Dr. Greenspan has focused his technical interests on the development of even more sophisticated airborne radar concepts that utilize both prior and on-board-gathered knowledge of the RF environment to optimally adapt its temporal, spectral, and spatial RF transmission and reception properties to allow the radar to achieve its objective with minimum susceptibility to, and interference with, the dynamically-changing ambient RF environment.

Awards/Honors: Dr. Greenspan was awarded the United Technologies Corporation George Mead Gold Medal for Engineering Achievement in 1973 for his pioneering work on the US Navy's A-6E radar. Then, twenty seven years later, in June of 2000, Dr. Greenspan was again honored for his pioneering radar work by being named as the first recipient of the IEEE Aerospace and Electronics Systems Society's Warren D. White award for Excellence in Radar Engineering that was established to recognize a radar engineer for the achievement of a major technical advance, or a series of advances over time, in the art of radar engineering. The award cited Dr. Greenspan for "significantly advancing the art in ground moving target indication (GMTI) airborne tactical radars through the implementation and exploitation of multiple phase center interferometric processing". In April 2004, Dr. Greenspan was one of the first recipients of the Northrop Grumman Electronic Systems Lifetime Achievement Award for "excellence in

radar technology for the development of multiple phase center interferometric radar signal processing for air and, space borne surveillance and tactical radars.”.. In addition, he was also the recipient of the 2009 IEEE Waveform Diversity and Design Conference Person of the Year Award for his Contributions to the Theory and Practical Techniques of Waveform Diversity and Design with Application to Advanced Radar Systems. Dr. Greenspan is a Senior Member of the IEEE and has been an elected member of the AES Radar Systems Panel for the past 14 years as well as a frequent author, presenter, and conference session chair at numerous national and international radar conferences, the holder of eight US Patents, and a past member of several industrial, academic and government advisory boards.