Lockheed Martin Uses Digital Beamforming Technology To Redefine Radar State-Of-The-Art

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Lockheed Martin successfully demonstrated digital beamforming (DBF) capability to locate and track live targets with its Scalable Solid-State S-band Radar (S4R) engineering development model.

DBF is the most advanced approach to phased-array antenna pattern control. It provides significant performance advantages over conventional analog beamforming techniques, including improved operations in severe environmental clutter and, through the use of multiple simultaneous beams, increased search and track timeline efficiency.

"Our S4R demonstration successes are quickly moving next generation radar technology -- such as digital beamforming -- from the laboratory to the fleet," said Carl Bannar, vice president and general manager of Lockheed Martin's Radar Systems line of business. "S4R will bring a huge radar technology leap to next generation multi-mission radars, ranging from littoral operations to ballistic missile defense."

The S4R engineering development model is an active, electronically-steered digital array radar designed to be scalable to support multiple missions, including air surveillance, cruise missile defense, ballistic missile defense, counter target acquisition and littoral operations. The proven digital array radar design is derived from the S-band antenna developed for the U.S. Navy's next-generation destroyer. The DBF signal processor was derived from the Aegis Ballistic Missile Defense signal processor.

The S4R engineering development model was developed using Silicon Carbide (SiC)-- based high-power Transmit/Receive modules. SiC provides greater power than other commonly used materials due to its increased heat tolerance. With more power, the radar has longer range and provides more precise target discrimination.

This S4R milestone continues Lockheed Martin's legacy of advanced naval radar development. The SPY-1 radar, the pre-eminent radar at sea today, is on 83 Aegis-equipped warships around the world, and is the main sensor for the Aegis Ballistic Missile Defense Weapon System.

Headquartered in Bethesda, MD, Lockheed Martin employs about 140,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.

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