

Department of the Navy SBIR/STTR Transition Program

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Topic # N211-086

N-Polar Gallium Nitride High Electron Mobility Transistor in Low-Cost Process Technology for mm-wave Transceiver Applications
MaXentric Technologies LLC

WHO

SYSCOM: ONR

Sponsoring Program: ONR

Transition Target: E-band wireless communication systems for military or commercial applications

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Other Transition Opportunities:

Multiple opportunities exist within the Navy, Marine Corps, Army, and Air Force and commercial E-band communication systems. MaXentric has targeted several programs within the armed services and commercial 5G industry primes to offer high efficiency amplifier products.

Notes:



<https://www.navy.mil/Resources/Photo-Gallery/igphoto/2003227124/>

WHAT

Operational Need and Improvement:

ANTHEM addresses an operational need for low-cost, high-performance, low-SWaP MMIC technology. The developed technology will be suitable as a T/R component for active electronically scanned array (AESA) applications. The low noise performance of the front-end amplifier is a key technology for wireless links to extend communication distance and to use a smaller size array at a lower cost.

Specifications Required:

LNAs must have a gain > 15 dB and noise figure 3.5 dB at 81-86 GHz. MMIC technology must use low-cost substrate and epitaxial design to support power amplifier devices and T/R switches.

Technology Developed:

ANTHEM uses N-polar-GaN-on-sapphire process to combine low-noise amplifier (LNA), power amplifier (PA), and transmit/receive (T/R) switch on a single chip operating at E-band for lower fabrication and integration costs.

Warfighter Value:

ANTHEM will deliver key low-cost, high-performance, robust components for high-data-rate communications in challenging environments. Currently, phased arrays are one of the most expensive components in modern wireless infrastructure equipment. Lowering the cost of these components will enable wide-scale deployment of high performing systems providing real-time tactical data and information sharing between ships and aircraft.

WHEN

Contract Number: N68335-22-C-0442

Ending on: Jul 31, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
PDK development	Low	Non-linear device model fits measured device performance	3	3rd QTR FY23
MMIC design	Low	Simulated performance meets requirements	3	1st QTR FY24
MMIC fabrication	Medium	Process control monitors meet process specifications	4	3rd QTR FY24
Prototype testing	Medium	Prototype performance meets requirements	4	4th QTR FY24

HOW

Projected Business Model:

MaXentric will invite interested parties (military and commercial) to review ANTHEM prototype performance at end of Phase II. Based on customer/partner feedback, MaXentric will adapt the transceiver module specifications to satisfy the target application. Main potential clients include, but are not limited to, the Department of Defense (DoD) and commercial telecommunications companies.

Company Objectives:

MaXentric is an industry leader in radio frequency technology and high-speed wireless communication devices, and strives to provide modern and efficient solutions for commercial and government usage.

Potential Commercial Applications:

Potential commercial applications include short-range, high-speed wireless backhaul links (e.g. home networks and last-mile wireless broadband delivery), satellite constellation communication services (SATCOM), and millimeter-wave radar for military applications (e.g. targeting and tracking). ANTHEM will also enable high-resolution imaging and sensors, with applications in surveillance, science, and the automotive industry.

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