

## Material to Aid Military in Next Generation Radar Systems Developed

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Researchers at Northeastern University have developed a magnetic material that will enable radar technology used by the U.S. military to be smaller, lighter, and cheaper without compromising on performance.

Many of the radar technologies used by the U.S. Navy and Air Force require magnetic fields to operate. A key component of these radar electronics is the circulator: a device that is integral to radar Simultaneous Transmit And Receive (STAR) technology.

Traditionally, circulator designs have relied on magnets positioned on either side of the circulator to create the necessary magnetic field for operation.

These magnets tend to be large and heavy and add significant cost to the assembly of radar systems. Thousands of them are required for the most advanced radar systems and as a result, radar platforms can weigh several tons and take up an inordinate amount of space, causing a heavy burden to the host aircraft or ship. The Navy and Air Force have been searching for a solution to this problem for decades.

The breakthrough occurred when Northeastern University researchers were able to create a magnetic ceramic thin film material that possesses a spontaneous magnetic moment sufficient to eliminate the need for magnets. This new material, in the form of millimeter thick films of Bahexaferrite, was produced using a screen printing processing scheme which meets all the necessary specifications for STAR radar



performance and is, in addition, highly cost-effective.

Researchers Vincent Harris, Carmine Vittoria, and Yajie Chen and their research team are about to embark upon developing prototypes of this technology for detailed testing. They hope that the technology will be available for widespread use by the Department of Defense by 2008.

"Northeastern University has one of the best research facilities in the country for magnetic ceramics research," said Harris, William Lincoln Smith Professor of Electrical and Computer Engineering at Northeastern University. "This development will help to solve a significant problem that has been hampering advancement in military technology for the past few decades."

The research was funded primarily by the Office of Naval Research as part of the "Navy After Next" initiative, the Defense Advanced Research Program Agency, and the National Science Foundation.

Source: Northeastern University

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