

Photonics Spectra

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## Uncooled IR Detector Could Enable Cheaper Cameras

LAWRENCE, Kan.

MSI engineers are working to develop an uncooled infrared detector that will enable the production of inexpensive IR cameras. Such a detector could penetrate such markets as vision assistance systems for automobiles and industrial monitoring devices.

Most manufacturers have targeted the military and aerospace industries for IR detectors -- sectors that demand high performance and can afford to pay for it. IR cameras have often exceeded \$10,000, a price out of reach for industrial applications.

In 1994, a team led by Donald Butler at Southern Methodist University (SMU) in Dallas began working with yttrium barium copper oxide (YBCO) to find a semiconductor that was less expensive and easier to fabricate than materials such as vanadium oxide. In the 1980s, researchers involved in US Department of Energy-funded programs investigating superconductors had worked with YBCO. Although the material was cryogenically cooled for that application, the SMU researchers discovered that -- left uncooled -- it still exhibited adequate sensitivity.


### Potential markets

Four years later, MSI bought the rights to incorporate YBCO into detectors. "With the sensitivity and ease of fabrication, we think we can put together a good sensor," said Henry Muller, a researcher and new product manager for the company.

The prototype will incorporate focal plane arrays of microbolometers that use thin YBCO films to measure changes in IR radiation. These arrays, Muller said, are compatible with existing silicon fabrication techniques. Some larger manufacturers of IR detector technology go through numerous steps in the production process to yield relatively few detectors. YBCO films also require no thermal processing and can be grown at room temperature in 30 minutes.

Applications may include thermal monitoring of commercial equipment such as machinery found in paper mills or on the floor of an automotive plant. Long term, the company may investigate equipping luxury cars with vision-assistance systems.

If it is successful, MSI will join Raytheon as one of only a handful of companies developing a low-cost IR camera. Raytheon is set to introduce a night-vision system in next year's Cadillac de Ville based on a barium strontium titanate detector. The

price will be in the range of a "high-end stereo system," according to Stuart Clapper, director of the automotive product line. 

Michael D. Wheeler

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Internet: <http://www.Photonics.com>

Email: [photonics@laurin.com](mailto:photonics@laurin.com)

Phone: (413) 499-0514, Fax: (413) 442-3180

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