



HEALTH CARE

## TECHNOLOGY LICENSE OPPORTUNITY

*A nonconfidential, no-obligation summary of technology available from Science Applications International Corporation*

# Hyperspectral Imaging (HSI) for Cancer Detection

**Highly detailed 3-D imaging distinguishes cancerous and precancerous tissue through endoscopic examination**

### BENEFITS

details not visible to the human eye or to other imaging techniques

Preliminary studies indicate that HSI can detect cancerous and precancerous tissue

Image covers large areas, minimizing risk of overlooking suspect tissue and precisely delineating tumor margins

Miniature probe size permits noninvasive diagnosis wherever endoscope can be used

### WHAT MAKES IT DISTINCT?

Measures colors simultaneously in hundreds of spectral bands, instead of just a handful of spectral bands, as with current technology

Provides objective, quantifiable data about the spectral “signatures” of suspect tissue to reduce reliance on subjective judgments

### TECHNOLOGY DESCRIPTION

Our HSI technology, which uses noninvasive hyperspectral imaging, shows promise in detecting cancerous and precancerous abnormalities in human tissue. The three-dimensional, optical imaging system employs high spectral resolution and narrow bandwidths to create highly detailed images that distinguish cancerous tissue from healthy tissues. A comparison of these tissue segments and cells permits diagnosis and delineation of suspect tissue.

### APPLICATIONS

Hyperspectral imaging can be used to detect cancerous tissues in all areas of the human body accessible through endoscopy:

- Oral cavity cancers — tongue, gum, mouth, tonsil, salivary gland
- Digestive system cancers — colorectal, stomach, esophagus, small intestine
- Respiratory system cancers — lung, bronchus, pleura, larynx
- Female genital cancers — corpus, ovary, vulva, uterus

Clinical and preclinical trials for cervical cancer and skin cancer are currently being conducted in those specific indications; all other indications are available for license.

### OVERVIEW

Cancer remains a primary cause of human mortality; treatment, though improving, is hampered by late or inadequate detection of cancerous and precancerous tissue. If the detection methodology lacks sufficient precision, surgical removal of cancerous tissue can be incomplete. Hyperspectral, noninvasive imaging examines human tissue with extremely high spectral resolution, detecting phenomena in extremely narrow bands of emission, thereby greatly increasing image resolution. With high resolution and multiple bandwidths, very subtle differences in the signature characteristics of tissues can be identified.

**ADDITIONAL  
NONCONFIDENTIAL  
INFORMATION  
AVAILABLE**

- Voluminous publications on clinical studies and market applications
- Copy of issued U.S. patents

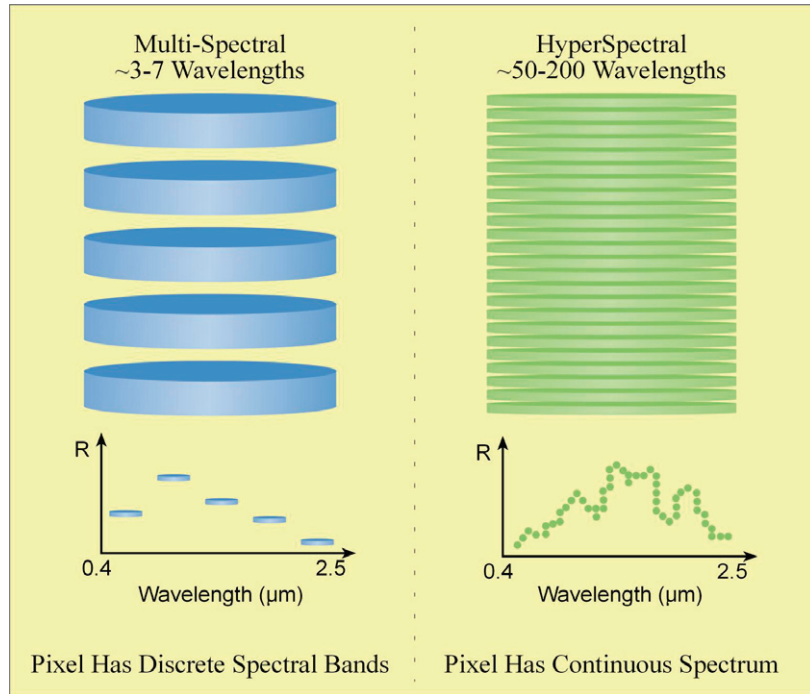
**ADDITIONAL  
INFORMATION UNDER  
NON-DISCLOSURE  
AGREEMENT**

- Proprietary third-party market research study

**FOR MORE  
INFORMATION  
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**CASE NUMBER  
09-021**



*Hyperspectral imaging permits evaluation of phenomena that cannot be observed under the 1 to 5 wavelengths of existing technology.*

This noninvasive imaging technique shows promise in detecting cancerous tissue on the skin or, via endoscopic procedures, on other human tissues. As such, it could simplify and possibly improve the diagnosis of cancer. The technology registers tissue characteristics under extremely small wavelength increments (in the nanometer range). This permits evaluation of phenomena that cannot be observed under the 1 to 5 wavelengths used with current technology. In addition, current imaging technology focuses on a point or spot of tissue, which may require multiple images and multiple sampling sites. Even then, these methods may still miss cancer cells in a small area that is not illuminated. By contrast, hyperspectral imaging technology takes a broad picture of an area, reducing the possibility of overlooking malignant tissue and increasing the precision of surgical removal.

**I.P. SUMMARY**

Techniques and Devices: “Hyperspectral imaging methods and apparatus for non-invasive diagnosis of tissue for cancer” — SAIC’s patent US 5,782,770, issued July 21, 1998.

Spectral Image Analysis Software: “Method for selecting representative endmember components from spectral data” — SAIC’s patent US 6,608,931, issued August 19, 2003

Spectral Image Analysis Software: “Method for selecting representative endmember components from spectral data” — SAIC’s patent US 6,741,740, issued May 25, 2004.

**STAGE of DEVELOPMENT**

Our HSI technology has been developed through prototype stage.

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