



SEARCH **ADVANCED SEARCH**

Optical Engineering: Journal Home Current Issue All Issues

Optical Engineering | Volume 51 | Issue 11 | Special Section on Hyperspectral Imaging Systems >

< Previous Article Next Article >

Special Section On Hyperspectral Imaging Systems

# Miniaturized visible near-infrared hyperspectral imager for remote-sensing applications

Christopher P. Warren ; Detlev Even ; William Pfister ; Keith Nakanishi ; Arleen Velasco ; David Breitwieser ; Selwyn Yee ; Joseph Naungayan  
[+] Author Affiliations

Opt. Eng. 51(11), 111720 (Aug 22, 2012). doi:10.1117/1.OE.51.11.111720

History: Received March 1, 2012; Revised July 20, 2012; Accepted July 24, 2012

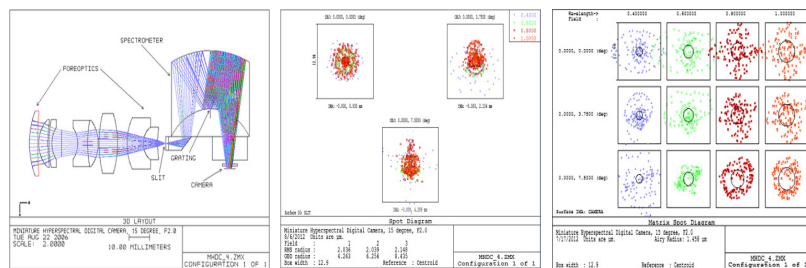
Text Size: A A A

Article [Figures](#) [Tables](#) [References](#)

## Abstract

Abstract | Introduction | VNIR microHSI™ Optical Design | VNIR microHSI™ Performance Predictions | VNIR Results | Conclusions | References

Abstract. A new approach for the design and fabrication of a miniaturized hyperspectral imager is described. A unique and compact instrument has been developed by taking advantage of light propagation within bonded solid blocks of optically transmitting glass. The resulting series of micro-hyperspectral imaging (microHSI™) spectrometer has been developed, patented, and built as a visible near-infrared (VNIR) hyperspectral sensor capable of operating in the 400- to 1000-nm wavelength range. The spectrometer employs a blazed, convex diffraction grating in Offner configuration embedded within the optical blocks for ruggedized operation. This, in combination with fast spectrometer operation at  $f/2.0$ , results in high optical throughput. The resulting microHSI™VNIR spectrometer weighs 0.54 kg, including foreoptics and camera, which results in a 2 × decrease in spectrometer volume compared with current air-spaced Offner spectrometers. These instruments can accommodate custom, ruggedized foreoptics to adapt to a wide range of field-of-view requirements. These fast, telecentric foreoptics are chromatically corrected for wideband spectral applications. Results of field and laboratory testing of the microHSI™ spectrometers are presented and show that the sensor consistently meets technical performance predictions.



Figures in this Article

© 2012 Society of Photo-Optical Instrumentation Engineers

## Topics

Some tools below are only available to our subscribers or users with an online account.

PDF	Email
Share	Get Citation
Get Permissions	Article Alerts
Slideset (.ppt)	

## Related Content

Customize your page view by dragging & repositioning the boxes below.

Related Journal Articles

[Filter By Topic >](#)

- Superconducting tunnel junctions as photon- counting imaging spectrometers from the optical to the x-ray band  
Optical Engineering (June 1, 2002)
  - Snapshot advantage: a review of the light collection improvement for parallel high-dimensional measurement systems  
Optical Engineering (November 1, 2012)
  - Optical Infrared Sky Survey Instrumentation  
Optical Engineering (June 1, 1980)
- [+] View More

Related Proceedings Articles

[Filter By Topic >](#)

- Snapshot hyperspectral fovea vision system (HyperVideo)  
Proceedings of SPIE (May 08 2012)
  - A highly integrated micropayload for broadband infrared spectrometry (HIBRIS)  
Proceedings of SPIE (August 19 2010)
  - Compact hyperspectral imager for low-light applications  
Proceedings of SPIE (July 02 2001)
- [+] View More

Related Book Chapters

[Filter By Topic >](#)

- Introduction
- Introduction to Imaging Spectrometers> Chapter 1. >

Cameras ; Diffraction gratings ; Equipment and services ; Hyperspectral systems ; Near infrared ; Remote sensing ; Sensors ; Spectrometers

Citation [Christopher P. Warren](#) ; [Detlev Even](#) ; [William Pfister](#) ; [Keith Nakanishi](#) ; [Arleen Velasco](#), et al.

"Miniaturized visible near-infrared hyperspectral imager for remote-sensing applications", *Opt. Eng.* 51(11), 111720 (Aug 22, 2012). ; <http://dx.doi.org/10.1117/1.OE.51.11.111720>

Access This Article

Sign In to Access Full Content

Username

Password

Sign In

Forgot your password? click [here](#) to reset it on our main site, [spie.org](http://spie.org)

Sign in via: [Shibboleth](#) 

Sign in or [Create a personal account](#) to buy this article (\$20 for members, \$25 for non-members).

Spectroscopy Instrumentation  
Fourier-Transform Spectroscopy  
Instrumentation Engineering> Chapter 1. >  
Echelle and Arrayed Waveguide Gratings for WDM and Spectral Analysis  
Advances in Information Optics and Photonics > Chapter 29. Communications and Networks>  
[\[+\] View More](#)

Topic Collections

- Optics
- Diffraction Optics
- Sensors
- Remote Sensing
- Hyperspectral Imaging

Advertisement

Site Map

- [HOME](#)
- [PROCEEDINGS](#)
- [JOURNALS](#)
- [eBOOKS](#)
- [TOPIC COLLECTIONS](#)

Services

- [Subscribe](#)
- [Alerts](#)
- [Information for Librarians](#)
- [Privacy Policy](#)
- [Terms Of Use](#)
- [Contact Us](#)
- [About the Digital Library](#)

Other Resources

- [SPIE.org](#)
- [SPIE Membership](#)
- [SPIE Career Center](#)

Information for Authors

- [Books](#)
- [Journals](#)
- [Proceedings](#)
- [Reprint Permissions](#)
- [About Open Access](#)

