371
Accession number:20124615667793
Title:Demonstration of passive W-band millimeter wave imaging using optical upconversion detection methodology with applications
Authors:Samluk, Jesse P. (1); Schuetz, Christopher A. (2); Dillon, Thomas (2); Martin, Richard D. (2); Stein Jr., E. Lee (3); Mackrides, Daniel G. (2); Wilson, John (1); Robbins, Andrew (4); Shi, Shouyuan (1); Chen, Caihua (5); Yao, Peng (1); Shireen, Rownak (1); Macario, Julien (1); Prather, Dennis W. (1)
Author affiliation:(1) Department of Electrical and Computer Engineering, University of Delaware, 140 Evans Hall, Newark, DE 19716, United States; (2) Phase Sensitive Innovations, Incorporated, 51 East Main Street, Newark, DE 19711, United States; (3) W. L. Gore and Associates, Incorporated, Electronics Products Division, 380 Starr Road, Landenberg, PA 19350, United States; (4) Siemens Healthcare DX, 604 GBC Drive, Newark, DE 19702, United States; (5) One Symbol Plaza, Motorola - Enterprise Mobility Business, Optical Engineering Advanced Data Capture, Mailstop: B-9, Holtsville, NY 11742, United States
Corresponding author:Samluk, J.P.(samluk@ece.udel.edu)
Source title:Journal of Infrared, Millimeter, and Terahertz Waves
Abbreviated source title:J. Infrared. Millim. Terahertz Waves
Volume:33
Issue:11
Issue date:November 2012
Publication year:2012
Pages:1076-1084
Language:English
ISSN:18666892
E-ISSN:18666906
Document type:Journal article (JA)
Publisher:Springer New York, 233 Spring Street, New York, NY 10013-1578, United States
Abstract:Millimeter wave (mmW) imaging has enjoyed a measure of success due to the unique properties of imaging in this spectral region, some of which are still being discovered. For example, a key advantage of mmW imaging is the ability to penetrate through various atmospheric obscurants, including fog, dust, sand, and smoke, due to its longer wavelengths as compared to visible or infrared imaging. Various methods of imaging with mmW energy exist, such as direct detection, downconversion, and upconversion, where this manuscript focuses on the latter. Until now, passive imaging using an optical upconversion method was limited to Q-band frequencies due to the lack of commercially available parts, namely a sufficiently high frequency optical modulator. To overcome this limitation, a custom-built modulator using inhouse fabrication facilities was realized to allow imaging within the W-band frequency range (75-110 GHz). Therefore, in this manuscript we report new results of passive imaging in the W-band frequency range using a unique optical upconversion technique, where the higher frequency operation allows for greater detail in the imagery thus collected. © Springer Science+Business Media, LLC 2012.
Number of references:19
Main heading:Thermography (imaging)

Controlled terms:Light modulators - Millimeter waves - Modulators
Uncontrolled terms:Direct detection - Downconversion - High frequency - Higher frequencies - Millimeter-wave imaging - MMW imaging - New results - Optical-upconversion - Passive imaging - Q-band frequencies - Spectral region - Up-conversion - W-band frequencies
Classification code:711 Electromagnetic Waves - 713.3 Modulators, Demodulators, Limiters, Discriminators, Mixers - 741.3 Optical Devices and Systems - 742.1 Photography
DOI:10.1007/s10762-012-9931-9
Database:Compendex