

PROCEEDINGS OF SPIE

# **Counterterrorism, Crime Fighting, Forensics, and Surveillance Technologies IV**

**Henri Bouma  
Radhakrishna Prabhu  
Robert J. Stokes  
Yitzhak Yitzhaky**  
*Editors*

**21–25 September 2020  
Online Only, United Kingdom**

*Sponsored by*  
SPIE

*Cooperating Organisations*  
European Optical Society  
Cranfield University (United Kingdom)  
Technology Scotland (United Kingdom)  
Visit Scotland (United Kingdom)  
CENSIS (United Kingdom)

*Published by*  
SPIE

**Volume 11542**

Proceedings of SPIE 0277-786X, V. 11542

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at [SPIDigitalLibrary.org](http://SPIDigitalLibrary.org).

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Counterterrorism, Crime Fighting, Forensics, and Surveillance Technologies IV*, edited by Henri Bouma, Radhakrishna Prabhu, Robert J. Stokes, Yitzhak Yitzhaky, Proceedings of SPIE Vol. 11542 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510638976

ISBN: 9781510638983 (electronic)

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) Fax +1 360 647 1445

[SPIE.org](http://SPIE.org)

Copyright © 2020, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at [copyright.com](http://copyright.com). Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/20/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL LIBRARY**

[SPIDigitalLibrary.org](http://SPIDigitalLibrary.org)

---

**Paper Numbering:** *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

# Contents

---

## SURVEILLANCE

---

- 11542 04 **Deep learning-based drone detection in infrared imagery with limited training data** [11542-1]
- 11542 05 **Visible to infrared transfer learning as a paradigm for accessible real-time object detection and classification in infrared imagery** [11542-2]
- 11542 06 **A scoring algorithm for abnormal traveller behaviour in border crossing areas** [11542-3]
- 11542 07 **Multi-user authorization for simultaneous collaborative situation analysis workspaces using XACML** [11542-4]
- 11542 08 **Mashup tools for big data analysis in maritime surveillance** [11542-5]

---

## IDENTIFICATION AND AUTHENTICATION

---

- 11542 0A **Anonymized person re-identification in surveillance cameras** [11542-7]
- 11542 0C **Document anonymization for border guards and immigration services** [11542-9]

---

## CBRNE AND SPECTROSCOPY I

---

- 11542 0D **Electrochemiluminescence Detection of Methamphetamine in Biological Matrices** [11542-10]
- 11542 0E **Detection of explosives by ultrasonic spectrum upon pulsed laser initiation** [11542-11]
- 11542 0F **A proof-of-concept of smart lightweight cone for explosive ordnance mitigation in nonpermissive operating environment** [11542-12]
- 11542 0H **Preliminary parameter studies to form pellets of hard materials for optical constants derived via single-angle reflectance spectroscopy** [11542-14]

---

## CBRNE AND SPECTROSCOPY II

---

- 11542 0J **Portable aerosol collector with liquid circulation mounted on a drone** [11542-16]

11542 OK **About impurities in cyclotrhylmethyltrinitramine and the possibility of detecting its vapors**  
[11542-17]

---

**BORDER SECURITY**

---

11542 OL **Design of x-ray backscatter imaging system for vehicle detection** [11542-18]

11542 ON **Detecting migrant vessels in the Cyprus region using Sentinel-1 SAR data** [11542-20]

---

**POSTER SESSION**

---

11542 OO **THz imaging with spectral resolution for identification of traces of explosives** [11542-21]

11542 OQ **Investigations of hollow-core photonic crystal fibres (HC-PCF) for trace explosive vapour detection** [11542-23]