PROCEEDINGS OF SPIE

Optics and Photonics for Counterterrorism, Crime Fighting, and Defence VIII

Colin Lewis
Douglas Burgess
Editors

24–26 September 2012
Edinburgh, United Kingdom

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Published by
SPIE

Volume 8546

Proceedings of SPIE 0277-786X, V.8546

Optics and Photonics for Counterterrorism, Crime Fighting, and Defence VIII,
edited by Colin Lewis, Douglas Burgess, Proc. of SPIE Vol. 8546, 854601
© 2012 SPIE · CCC code: 0277-786/12/$18 · doi: 10.1117/12.2014713

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Please use the following format to cite material from this book:
Author(s), "Title of Paper," in *Optics and Photonics for Counterterrorism, Crime Fighting, and Defence VIII*, edited by Colin Lewis, Douglas Burgess, Proceedings of SPIE Vol. 8546 (SPIE, Bellingham, WA, 2012) Article CID Number.

ISSN: 0277-786X
ISBN: 9780819492876

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

Printed in the United States of America.

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

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Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

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Introduction

Welcome to the proceedings of the 2012 conference 8546 on Optics and Photonics for Counterterrorism, Crime Fighting and Defence, held in Edinburgh in the UK. The conference covered the major hard problems encountered by these three communities: analysing materials and objects that might be dangerous, sensing the more distant surroundings for threats, and interpreting activity captured by TV cameras.

We again highlighted the "proximal" distance between 0.1 and 2 metres where communities' activities overlap. But whilst first responders coming to a terrorist incident would describe this as "stand off", conventional military forces would regard them as extremely dangerous short range activities. Whilst different users face these similar threats, their various legal frameworks determine the level of uncertainty they can tolerate. For example, first responders may need only an alert that something in the area may be dangerous. On the other hand, forensic examiners collecting evidence for court proceedings need to be much more certain about what they have found.

One topic that arose during the conference was that of target and sensor geometry. At short range an operator knows where to direct his instrument, as he has the suspicious material in his sight. In contrast, when operated at a safe distance, a laser-based sensor will not cover the whole field of regard and needs to be cued onto its target. Without this aid, the time for an operator to scan a complete scene is likely to be unacceptably long. There were several papers describing sensors that could interrogate an area, thus avoiding this problem; either by using fast 2d scanning of a focussed laser beam, or by employing a 2d sensor array to image the return from a scene flooded by radiation.

Sensitivity and specificity, and how these two parameters work together, was another subject for discussion. Whilst impressive increases in detector sensitivity were described by some speakers (essential so that dilute or remote dangerous materials are not missed), the need to avoid excessive false alarms was also recognised. One solution to this problem, described by a number of presenters, was to increase the number of discriminants by using better spectral or temporal sensing.

With so much imagery being captured from installed security cameras, the conference concentrated the imaging theme on automatic processing techniques to help find and track suspicious objects, people, and vehicles, and on the effects on performance of restricted data bandwidths. We used the topic of sensing at long range as the starting point for a lively discussion on how to compensate for atmospheric turbulence effects.

If you came to the 2012 conference, or if you are reading this book or CD and wished you'd been there, or feel you can contribute to next year's event, then please note that we shall be in Dresden in 2013.

Colin Lewis
Doug Burgess