

PROCEEDINGS OF SPIE

[SPIDigitalLibrary.org/conference-proceedings-of-spie](https://spiedigitallibrary.org/conference-proceedings-of-spie)

Front Matter: Volume 8407

, "Front Matter: Volume 8407," Proc. SPIE 8407, Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications 2012, 840701 (10 July 2012); doi: 10.1117/12.977661

SPIE.

Event: SPIE Defense, Security, and Sensing, 2012, Baltimore, Maryland, United States

PROCEEDINGS OF SPIE

Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications 2012

Jerome J. Braun
Chair

25–26 April 2012
Baltimore, Maryland, United States

Sponsored and Published by
SPIE

Volume 8407

Proceedings of SPIE, 0277-786X, v. 8407

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

Proc. of SPIE Vol. 8407 840701-1

The papers included 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. The papers published in these proceedings 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 this book:

Author(s), "Title of Paper," in *Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications 2012*, Proceedings of SPIE Vol. 8407 (SPIE, Bellingham, WA, 2012) Article CID Number.

ISSN 0277-786X
ISBN 9780819490858

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

Copyright © 2012, 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 \$18.00 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. 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/12/\$18.00.

Printed in the United States of America.

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

The logo for SPIE Digital Library features the word "SPIE" in a bold, sans-serif font above the words "Digital Library" in a smaller, lighter font. To the right of the text is a stylized graphic consisting of three vertical bars of increasing height, resembling a barcode or a signal waveform.

SPIDigitalLibrary.org

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:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

vii *Conference Committee*

SESSION 1 INFORMATION FUSION APPROACHES AND ALGORITHMS I

- 8407 02 **Spectral and spatial algorithm architecture for classification of hyperspectral and LIDAR** [8407-01]
R. S. Rand, T. S. Khuon, National Geospatial-Intelligence Agency (United States)
- 8407 03 **Effects of aberrations on image reconstruction of data from hybrid intensity interferometers** [8407-02]
J. Murray-Krezan, P. N. Crabtree, Air Force Research Lab. (United States)
- 8407 04 **Multisource taxonomy-based classification using the transferable belief model** [8407-03]
W. J. Farrell III, A. M. Knapp, Lakota Technical Solutions, Inc. (United States)
- 8407 05 **Computationally efficient Bayesian tracking** [8407-04]
J. Aughenbaugh, B. La Cour, Univ. of Texas at Austin (United States)

SESSION 2 INFORMATION FUSION APPROACHES AND ALGORITHMS II

- 8407 07 **Cross layers decision making and fusion model in layered sensing systems** [8407-06]
A. Khoshnaw, S. Zein-Sabatto, M. Malkani, Tennessee State Univ. (United States)
- 8407 09 **Leveraging provenance to improve data fusion in sensor networks** [8407-09]
G. Dogan, City Univ. of New York (United States); E. Seo, Univ. of Illinois at Urbana-Champaign (United States); T. Brown, City Univ. of New York (United States); T. F. Abdelzaher, Univ. of Illinois at Urbana-Champaign (United States)
- 8407 0A **Analysis of decision fusion algorithms in handling uncertainties for integrated health monitoring systems** [8407-10]
S. Zein-Sabatto, M. Mikhail, M. Bodruzzaman, Tennessee State Univ. (United States); M. DeSimio, Univ. of Dayton Research Institute (United States); M. Derriso, A. Behbahani, Air Force Research Lab. (United States)

SESSION 3 INFORMATION FUSION IN ROBOTICS

- 8407 0B **Multirobot autonomous landmine detection using distributed multisensor information aggregation** [8407-11]
J. Jumadinova, P. Dasgupta, Univ. of Nebraska at Omaha (United States)
- 8407 0C **Architectural design and support for knowledge sharing across heterogeneous MAST systems** [8407-12]
R. C. Arkin, S. Garcia-Vergara, S. G. Lee, Georgia Institute of Technology (United States)

- 8407 0D **Navigation of uncertain terrain by fusion of information from real and synthetic imagery** [8407-13]
D. M. Lyons, P. Nirmal, Fordham Univ. (United States); D. P. Benjamin, Pace Univ. (United States)
- 8407 0E **Allothetic and idiothetic sensor fusion in rat-inspired robot localization** [8407-14]
A. Weitzenfeld, Univ. of South Florida Polytechnic (United States); J.-M. Fellous, The Univ. of Arizona (United States); A. Barrera, Instituto Tecnológico Autónomo De México (Mexico); G. Tejera, Univ. de la República (Uruguay)
- 8407 0F **Using a virtual world for robot planning** [8407-15]
D. P. Benjamin, J. V. Monaco, Y. Lin, C. Funk, Pace Univ. (United States); D. Lyons, Fordham Univ. (United States)
- 8407 0G **Using arm and hand gestures to command robots during stealth operations** [8407-16]
A. Stoica, C. Assad, M. Wolf, K. S. You, M. Pavone, T. Huntsberger, Y. Iwashita, Jet Propulsion Lab. (United States)

SESSION 4 INFORMATION FUSION APPROACHES AND ALGORITHMS III (BIOMETRICS-RELATED)

- 8407 0H **Multimodal biometric approach for cancelable face template generation** [8407-17]
P. P. Paul, M. Gavrilova, Univ. of Calgary (Canada)
- 8407 0J **Context based gait recognition** [8407-19]
S. Bazazian, M. Gavrilova, Univ. of Calgary (Canada)
- 8407 0L **Real-time threat assessment for critical infrastructure protection: data incest and conflict in evidential reasoning** [8407-21]
R. Brandon, S. Page, J. Varndell, Digital Barriers Guildford (United Kingdom)

SESSION 5 IMAGE FUSION

- 8407 0M **Automatic and generic mosaicing of multisensor images: an application to Pleiades HR** [8407-22]
F. Bignalet-Cazalet, S. Baillarin, D. Greslou, Ctr. National d'Études Spatiales (France)
- 8407 0N **Adaptive optimal spectral range for dynamically changing scene** [8407-23]
E. Pinsky, A. Siman-tov, D. Peles, Rafael Ltd. (Israel)
- 8407 0O **Colour-the-INSight: combining a direct view rifle sight with fused intensified and thermal imagery** [8407-24]
M. A. Hogervorst, C. Jansen, A. Toet, P. Bijl, TNO Human Factors (Netherlands); P. Bakker, Thales Nederland B.V. (Netherlands); A. C. Hiddema, PHOTONIS Netherlands B.V. (Netherlands); S. F. van Vliet, Ministry of Defence (Netherlands)

SESSION 6 INFORMATION FUSION APPROACHES AND ALGORITHMS IV (HUMAN-IN-THE-LOOP)

- 8407 OQ **Advances in data representation for hard/soft information fusion** [8407-26]
J. C. Rimland, D. Coughlin, D. L. Hall, J. L. Graham, Pennsylvania State Univ. (United States)
- 8407 OR **Human cognitive and perceptual factors in JDL level 4 hard/soft data fusion** [8407-27]
J. C. Rimland, D. L. Hall, J. L. Graham, Pennsylvania State Univ. (United States)
- 8407 OS **Use of sonification in the detection of anomalous events** [8407-28]
M. Ballora, Pennsylvania State Univ. (United States); R. J. Cole, H. Kruesi, H. Greene, Raytheon Corp. (United States); G. Monahan, D. L. Hall, Pennsylvania State Univ. (United States)
- 8407 OT **Homeland situation awareness through mining and fusing heterogeneous information from intelligence databases and field sensors** [8407-29]
G. Digioia, Univ. degli Studi di Roma Tre (Italy) and Engineering Ingegneria Informatica SpA (Italy); S. Panzieri, Univ. degli Studi di Roma Tre (Italy)
- 8407 OU **Multisource causal data mining** [8407-30]
R. Woodley, M. Gosnell, K. Shallenberger, 21st Century Systems, Inc. (United States)

SESSION 7 INFORMATION FUSION SYSTEMS AND EVALUATION MEASURES

- 8407 OW **Agent-based analysis of trustworthiness in wireless sensor networks** [8407-32]
R. Fernandes, B. Li, K. Vadakkeveedu, A. Verma, P. Gustafson, Knowledge Based Systems, Inc. (United States); J. Hwang, Air Force Research Lab. (United States)
- 8407 OX **Practical considerations in Bayesian fusion of point sensors** [8407-33]
K. Johnson, Naval Research Lab. (United States); C. Minor, Nova Research, Inc. (United States)

POSTER SESSION

- 8407 OY **Adaptive IR and VIS image fusion** [8407-35]
B. Stoklasa, J. Rehacek, Z. Hradil, Palacky Univ. (Czech Republic)

Author Index

Conference Committee

Symposium Chair

Kevin P. Meiners, Office of the Secretary of Defense (United States)

Symposium Cochair

Kenneth R. Israel, Lockheed Martin Corporation (United States)

Conference Chair

Jerome J. Braun, MIT Lincoln Laboratory (United States)

Program Committee

Sheela V. Belur, The Van Dyke Technology Group, Inc. (United States)

D. Paul Benjamin, Pace University (United States)

Belur V. Dasarathy, Information Fusion Technologies (United States)

Michael Heizmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Charles F. Hester, U.S. Army Research, Development and Engineering Command (United States)

Mieczyslaw M. Kokar, Northeastern University (United States)

Damian M. Lyons, Fordham University (United States)

Mirela Popa, General Dynamics Armament and Technical Products (United States)

Firooz A. Sadjadi, Lockheed Martin Maritime Systems & Sensors (United States)

Pierre Valin, Defence Research and Development Canada, Valcartier (Canada)

Pramod Kumar Varshney, Syracuse University (United States)

Shanchieh Jay Yang, Rochester Institute of Technology (United States)

Session Chairs

- 1 Information Fusion Approaches and Algorithms I
Jerome J. Braun, MIT Lincoln Laboratory (United States)
Damian M. Lyons, Fordham University (United States)
- 2 Information Fusion Approaches and Algorithms II
Mirela Popa, Chemring Detection Systems, Inc. (United States)
Charles F. Hester, U.S. Army Research, Development and Engineering Command (United States)

- 3 Information Fusion in Robotics
Damian M. Lyons, Fordham University (United States)
D. Paul Benjamin, Pace University (United States)
- 4 Information Fusion Approaches and Algorithms III (Biometrics-related)
D. Paul Benjamin, Pace University (United States)
Jerome J. Braun, MIT Lincoln Laboratory (United States)
- 5 Image Fusion
Charles F. Hester, U.S. Army Research, Development and Engineering
Command (United States)
Pierre Valin, Defence Research and Development Canada, Valcartier
(Canada)
- 6 Information Fusion Approaches and Algorithms IV (Human-in-the-loop)
Pierre Valin, Defence Research and Development Canada, Valcartier
(Canada)
Mirela Popa, Chemring Detection Systems, Inc. (United States)
- 7 Information Fusion Systems and Evaluation Measures
Damian M. Lyons, Fordham University (United States)
Charles F. Hester, U.S. Army Research, Development and Engineering
Command (United States)