

PROCEEDINGS OF SPIE

***Multisensor, Multisource
Information Fusion: Architectures,
Algorithms, and Applications
2016***

Jerome J. Braun
Chair

20–21 April 2016
Baltimore, Maryland, United States

Sponsored and Published by
SPIE

Volume 9872

Proceedings of SPIE 0277-786X, V. 9872

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

Multisensor, Multisource Information Fusion: Architectures, Algorithms,
and Applications 2016, Proc. of SPIE Vol. 9872, 987201 · © 2016 SPIE
CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2244123

Proc. of SPIE Vol. 9872 987201-1

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.

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 *Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications 2016*, Proceedings of SPIE Vol. 9872 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)
ISBN: 9781510601130

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 © 2016, 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/16/\$18.00.

Printed in the United States of America.

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

**SPIE. DIGITAL
LIBRARY**
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 six-digit CID article numbering system structured as follows:

- 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.

Contents

v	<i>Authors</i>
vii	<i>Conference Committee</i>

SESSION 1	INFORMATION FUSION APPROACHES AND ALGORITHMS I
------------------	---

9872 02	Towards the exploitation of formal methods for information fusion [9872-1]
9872 03	Semantic segmentation of multispectral overhead imagery [9872-2]
9872 04	Optimal rotation sequences for active perception [9872-3]

SESSION 2	INFORMATION FUSION APPROACHES AND ALGORITHMS II
------------------	--

9872 06	Visualization to support identification, exploitation, and fusion of data and information delivered from heterogeneous sources in ISR [9872-5]
9872 07	PASES: combining radar and video sensing for improved pedestrian safety [9872-6]

SESSION 3	INFORMATION FUSION APPROACHES AND ALGORITHMS III
------------------	---

9872 0A	Evaluation of the use of laser scanning to create key models for 3D printing separate from and augmenting visible light sensing [9872-9]
9872 0B	In-drilling alignment scheme for borehole assembly trajectory tracking over a wireless ad hoc network [9872-10]
9872 0C	Proposed health state awareness of helicopter blades using an artificial neural network strategy [9872-11]

SESSION 4	INFORMATION FUSION AND ROBOTICS
------------------	--

9872 0D	Progress in building a cognitive vision system [9872-12]
9872 0F	Mobile robot and mobile manipulator research towards ASTM standards development [9872-14]

INTERACTIVE POSTER SESSION	
-----------------------------------	--

9872 0G	Modeling of systems wireless data transmission based on antenna arrays in underwater acoustic channels [9872-15]
---------	---

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Benjamin, D. Paul, 0D
Bostelman, Roger, 0F
Chenault, David B., 07
Clemens, Joachim, 02, 04
Eck, Ralf, 06
Edmondson, Richard P., 07
Fedosov, V. P., 0G
Gadsden, S. Andrew, 0C
Grasemann, Gunther, 06
Habtour, Ed, 0C
Haferkorn, Daniel, 06
Hartmann, K., 0B
Hong, Tsai, 0F
Jamboti, Kavyashree, 06
Kerlin, Scott, 0A
Kuwertz, Achim, 06
Lee, Andrew, 0C
Legin, A. A., 0G
Legowik, Steven, 0F
Lomakina, A. V., 0G
Lyons, Damian, 0D
Nakath, David, 04
Odei-Lartey, E., 0B
Pope, Paul A., 03
Prasad, Lakshman, 03
Rachuy, Carsten, 04
Schill, Kerstin, 02, 04
Sentz, Kari, 03
Straub, Jeremy, 0A
Van de Camp, Florian, 06
Voronin, V. V., 0G
Wille, Robert, 02
Yue, Hong, 0D

Conference Committee

Symposium Chair

Ming C. Wu, University of California, Berkeley (United States)

Symposium Co-chair

Majid Rabbani, Eastman Kodak Company (United States)

Conference Chair

Jerome J. Braun (United States)

Conference 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, Chemring Detection Systems, Inc. (United States)

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

Pramod Kumar Varshney, Syracuse University (United States)

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

Robert S. Lynch, University of Connecticut (United States)

Session Chairs

- 1 Information Fusion Approaches and Algorithms I
Jerome J. Braun (United States)
- 2 Information Fusion Approaches and Algorithms II
D. Paul Benjamin, Pace University (United States)
- 3 Information Fusion Approaches and Algorithms III
D. Paul Benjamin, Pace University (United States)

- 4 Information Fusion and Robotics
Jerome J. Braun (United States)