PROCEEDINGS OF SPIE

Acquisition, Tracking, Pointing, and Laser Systems Technologies XXV

William E. Thompson
Paul F. McManamon
Editors

25–26 April 2011
Orlando, Florida, United States

Sponsored and Published by
SPIE

Volume 8052

Proceedings of SPIE, 0277-786X, v. 8052

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 *Acquisition, Tracking, Pointing, and Laser Systems Technologies XXV*, edited by William E. Thompson, Paul F. McManamon, Proceedings of SPIE Vol. 8052 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X
ISBN 9780819486264

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.

SPIE Digital Library

SPIEDigitalLibrary.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

Conference Committee

Symposium Chair

William Jeffrey, HRL Laboratories, LLC (United States)

Symposium Cochair

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

Conference Chairs

William E. Thompson, New Mexico Institute of Mining and Technology (United States)
Paul F. McManamon, Exciting Technology, LLC (United States)

Conference Cochair

Ali T. Alouani, Tennessee Technological University (United States)

Program Committee

William D. Blair, Georgia Tech Research Institute (United States)
David Blacknell, Defence Science and Technology Laboratory (United Kingdom)
Gillian K. Groves, Raytheon Space & Airborne Systems (United States)
Dan C. Herrick, Air Force Research Laboratory (United States)
James M. Hilkert, Alpha-Theta Technologies (United States)
Paul S. Idell, The Boeing Company (United States)
Eric Kaltenbacher, SRI St. Petersburg (United States)
Christopher J. Musial, Boeing-SVS, Inc. (United States)
Kevin Probst, Core Group, Inc. (United States)
Jim F. Riker, Air Force Research Laboratory (United States)
Mike C. Roggemann, Michigan Technological University (United States)
Juan R. Vasquez, Numerica Corporation (United States)
Matthew R. Whiteley, MZA Associates Corporation (United States)

Session Chairs

1 Requirements and System-Level Applications
Paul F. McManamon, Exciting Technology, LLC (United States)
Dan C. Herrick, Air Force Research Laboratory (United States)

Introduction

The SPIE Acquisition, Tracking, Pointing, and Laser Systems Technologies conference continues a tradition of providing a venue for the presentation of new research and a well-documented annual assessment of on-going, practical acquisition, tracking, and pointing technology. Locating, identifying, locking onto, and maintaining track on dynamic targets is absolutely essential for precision photonic and optical systems to be able to achieve their performance goals. This year a rapid beam steering session was added, providing a look at both traditional and revolutionary beam steering methods. The conference has focused on both theory and practice, and has spanned all aspects of design, analysis, simulation, development, and testing. As a result, the last twenty-five years of Proceedings from this conference provide a comprehensive history of the major technical developments within this field. The conference also includes other optics and beam control technologies, such as adaptive optics and precision line-of-sight stabilization, which are needed for many implementations of laser-based acquisition, tracking, and pointing systems in the field.

The specific advancements included in the 2011 conference reported in these Proceedings include: requirements and systems level applications, image and signal processing for target tracking, control systems and components, and finally the new session, rapid beam steering.

The two and a half decade long-running success of this SPIE conference is clearly dependent on many authors and their sponsoring organizations who freely share their work with others. We extend a sincere appreciation to each of these contributors, as well as our fellow conference organizers who actively encourage their colleagues and professional associates to be a part of this event. We also recognize and appreciate the excellent SPIE staff that makes organizing these conferences such a pleasant experience.

Watch for the Call for Papers for the 2012 conference: Acquisition, Tracking, Pointing, and Laser Systems Technologies XXVI. We expect to continue the present scope of the conference with only minor changes.

William E. Thompson
Paul F. McManamon