

PROCEEDINGS OF SPIE

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

Front Matter: Volume 7523

Proceedings of SPIE

Proceedings of SPIE, "Front Matter: Volume 7523," Proc. SPIE 7523, Optical Technologies for Telecommunications 2009, 752301 (23 January 2010); doi: 10.1117/12.858842

SPIE.

Event: Optical Technologies for Telecommunications 2009, 2009, Samara, Russian Federation

PROCEEDINGS OF SPIE

Optical Technologies for Telecommunications 2009

Vladimir A. Andreev
Vladimir A. Burdin
Oleg G. Morozov
Albert H. Sultanov
Editors

17–19 November 2009
Samara, Russian Federation

Organized by
Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
Kazan State Technical University (Russian Federation)
Ufa State Aviation Technical University (Russian Federation)
RBIT a Non-Profit Partnership (Russian Federation)

Published by
SPIE

Volume 7523

Proceedings of SPIE, 0277-786X, v. 7523

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

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 *Optical Technologies for Telecommunications 2009*, edited by Vladimir A. Andreev, Vladimir A. Burdin, Oleg G. Morozov, Albert H. Sultanov, Proceedings of SPIE Vol. 7523 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X
ISBN 9780819479136

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 © 2010, 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/10/\$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 bar chart 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 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	<i>Conference Committee</i>
ix	<i>Introduction</i>

SESSION 1 OPTICAL TELECOMMUNICATION TECHNOLOGIES AND SYSTEMS

- 7523 02 **Analysis of optical communication systems simulation software for educational purposes** [7523-03]
O. G. Morozov, Kazan State Technical Univ. (Russian Federation); T. S. Sadeev, Kazan State Technical Univ. (Russian Federation) and Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation); G. G. Khusainova, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation)
- 7523 03 **The approach to a segment construction for all networks with a switching mode, independent of the protocol** [7523-10]
A. H. Sultanov, I. L. Vinogradova, V. M. Konyuhova, Ufa State Aviation Technical Univ. (Russian Federation)
- 7523 04 **Simulation of polarization mode dispersion compensation based on EMTY-model and nonlinear optimization** [7523-11]
A. H. Sultanov, Ufa State Aviation Technical Univ. (Russian Federation); C. Schaeffer, Helmut Schmidt Univ. (Germany); V. K. Bagmanov, Ufa State Aviation Technical Univ. (Russian Federation); M. Haas, Technical Univ. Dresden (Germany); S. Kharitonov, Ufa State Aviation Technical Univ. (Russian Federation)
- 7523 05 **Simulation of a few-mode signal propagation over multimode fiber link with differential mode delay compensators** [7523-14]
A. V. Bourdine, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation)
- 7523 06 **Dense dispersion management soliton-like pulse dynamic in fiber optic line with deviation of dispersion map parameters** [7523-21]
V. A. Burdin, M. V. Dashkov, K. A. Volkov, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation)

SESSION 2 PASSIVE AND ACTIVE COMPONENTS OF OPTICAL TELECOMMUNICATIONS

- 7523 07 **Calculation of dispersion characteristics of microstructured optical fibers by the finite element method** [7523-05]
V. A. Burdin, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation); O. R. Delmukhametov, Ufa State Aviation Technical Univ. (Russian Federation)
- 7523 08 **Fiber optic sensors for parachute systems monitoring** [7523-07]
P. M. Nikolayev, A. M. Nikolayev, Y. M. Nikolayev, Science Research Institute of Aeroelastic Systems (Ukraine); S. A. Tzarev, Radiopribor JSC (Russian Federation); M. Y. Zastela, Kazan

- State Technical Univ. (Russian Federation)
- 7523 09 **Fiber optic Mach-Zehnder interferometer for research of optical material properties** [7523-09]
A. H. Sultanov, A. I. Salikhov, Ufa State Aviation Technical Univ. (Russian Federation)
- 7523 0A **Errors of optical fiber chromatic dispersion calculation caused by line approximation of silica glass refraction index as a function of dopant concentration** [7523-13]
V. A. Burdin, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation)
- 7523 0B **Propagation of laser vortex beams in a parabolic optical fiber** [7523-16]
S. N. Kohnina, A. S. Striletz, A. A. Kovalev, V. V. Kotlyar, Samara State Aerospace Univ. (Russian Federation)
- 7523 0C **Mode delay caused by defects of graded refractive index profile** [7523-20]
A. V. Bourdine, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation); O. R. Delmukhametov, Ufa State Aviation Technical Univ. (Russian Federation)
- 7523 0D **Spectrum conversion investigation in lithium niobate Mach-Zehnder modulator** [7523-22]
O. G. Morozov, D. L. Aybatov, Kazan State Technical Univ. (Russian Federation)

SESSION 3 ONE-DIMENSIONAL AND MULTIDIMENSIONAL OPTICAL SIGNAL DATA PROCESSING

- 7523 0E **Modeling controlled diffractive elements based on the linear electro-optic effect** [7523-01]
S. A. Matyunin, V. D. Paranin, Samara State Aerospace Univ. (Russian Federation)
- 7523 0F **Numerical modelling of the nonlinear evolutionary equations on the basis of an inverse scattering method** [7523-04]
I. V. Grigorov, Povolzhskiy State Univ. of Telecommunications and Informatics (Russian Federation)
- 7523 0G **Modulation techniques for operative aerosol monitoring to FSO links parameters improving** [7523-08]
Y. E. Pol'skii, G. I. Il'in, O. G. Morozov, G. A. Morozov, D. L. Ovtchinnikov, Kazan State Technical Univ. (Russian Federation)
- 7523 0H **DOE-based optical scheme for the universal generation and conversion of inhomogeneously polarized laser beams** [7523-15]
S. N. Khonina, S. V. Karpeev, Samara State Aerospace Univ. (Russian Federation)

SESSION 4 OPTICAL NETWORKS MAINTENANCE, CONTROL, AND RESTORATION

- 7523 0I **Method choice for port sealing of fibre optic closures in extreme conditions** [7523-02]
I. N. Alekhin, V. A. Burdin, Povolzhskiy State Univ. of Telecommunication and Informatics (Russian Federation); S. G. Oniszenko, Samarskaya Optical Cable Co. (Russian Federation)
- 7523 0J **Sensor on the twisted fibers for building construction monitoring** [7523-06]
O. G. Morozov, A. N. Alekseev, Y. E. Pol'skii, Kazan State Technical Univ. (Russian Federation)

7523 0K **Polarization optical time domain reflectometer with linear extension of pulse width** [7523-18]
V. A. Burdin, M. V. Dashkov, Povolzhskiy State Univ. of Telecommunication and Informatics
(Russian Federation)

Author Index

Conference Committee

Conference Chairs

- Vladimir A. Andreev**, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
Vladimir A. Burdin, Povolzhskiy State Academy of Telecommunications and Informatics (Russian Federation)
Oleg G. Morozov, Kazan State Technical University (Russian Federation)
Albert H. Sultanov, Ufa State Aviation Technical University (Russian Federation)

Program Committee

- R. A. Badamshin**, Ufa State Aviation Technical University (Russian Federation)
V. H. Bagmanov, Ufa State Aviation Technical University (Russian Federation)
A. L. Buzov, Samara Radio Research and Development Institute (Russian Federation)
O. V. Goryachkin, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
V. P. Kubanov, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
D. V. Mishin, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
A. F. Nadeev, Kazan State Technical University (Russian Federation)
V. A. Neganov, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
O. V. Osipov, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
Y. M. Spodobaev, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
A. I. Tyazhev, Povolzhskiy State University of Telecommunications and Informatics (Russian Federation)
R. G. Usmanov, Bashinforsvyaz (Russian Federation)

Introduction

This volume contains a selection of papers presented at the ninth International Conference on Optical Technologies for Telecommunications. The conference was held 17–19 November 2009 at Povolzhskiy State University of Telecommunications and Informatics in Samara, Russia.

The conference was held during the remarkable year of 150th birthday anniversary of Alexander S. Popov, a famous Russian scientist. The scientific activity of A. S. Popov provided great advantages in the development of radiotechnics.

The conference covered a large range of problems in optical technologies in telecommunications. The papers accepted for publication in this volume were chosen from papers presented at the conference on the topics mentioned in the table of contents.

We have no doubt that the proceedings of this conference will be helpful for both scientists and specialists working in the fields of telecommunication technologies.

Vladimir A. Andreev
Vladimir A. Burdin
Oleg G. Morozov
Albert H. Sultanov

