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**Edward W. Taylor
David A. Cardimona**
Editors

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Introduction

The third SPIE conference on Nanophotonics and Macrophotonics for Space Environments (NMSE III) proved to be a highly diversified and interesting conference since, in part, it was an outgrowth from the previous SPIE Photonics for Space Environments I-XI conferences with the infusion of new nanotechnology topics. The synergism of nanotechnology and photonics for addressing and advancing space applications was clearly evident and has proven to be an excellent choice for this conference, providing a unique and useful forum.

Many invited papers were presented as well as two excellent keynote presentations, one by Dr. Kenneth Singer of Case Western Reserve University and the other by Dr. Alexei Maradudin of the University of California, Irvine. Dr. Singer's talk dealt with his research in manufacturing and processing layered polymeric optical systems, such as gradient index lenses, lasers, and photonic crystals, and Dr. Maradudin described some very exciting new research in plasmonic analogues to several effects known in regular optics, such as double-slit interference.

The conference covered a wide range of topics which indicates the steady diffusion of nano and plasmonic technology toward space systems and related applications. As in the first two NMSE conferences, papers were presented regarding NASA photonic technologies and missions, ionizing radiation effects in quantum dot based solar cells, and new topics dealing with the use of optical limiting materials for protecting space components. Presentations on the use of self-cleaning photonic coatings for lunar operations and applications of commercial, off-the-shelf devices and circuits provided a stark comparison between differences in required Earth and lunar technologies. Related papers on radiation-induced effects and radiation hardening of organic photonic materials and devices indicated that organic-polymer issues were being addressed and progress made for applying the technologies. Different from past years, several interesting papers reporting advances in magnetic sensing in organic devices for application to satellite attitude sensing, as well as papers on novel nanostructures for lasers or optical amplifiers, were presented. A paper on layered polymer structures for photonic devices addressing reduced size and weight for launch considerations as well as radiation hardness for use in space was well received. Papers on photonic requirements for space object characterization and a presentation describing a new concept for a hyperspectral detector for space object identification were also well received. Two related sessions on THz sources and/or detectors for satellite communication and a large session on new research for improving the performance of strained-layer superlattice and quantum dot IR detectors for space situational awareness and space object detection and identification were well attended.

We look forward to the next convening of the SPIE NMSE conference and expect that additional and advanced nano-, micro-, and macrophotonic areas of research and development will be presented and continue to expand and improve the conference objectives.

The chairs wish to thank the program committee, speakers, session chairs, and especially the SPIE staff for their many contributions to making the NMSE III conference a success.

Edward W. Taylor
David A. Cardimona