

PROCEEDINGS OF SPIE

Space, Satellites, and Sustainability II

Mathew Williams
Callum J. Norrie
Kristina Tamane
Editors

28-30 September 2021
Glasgow, United Kingdom

Sponsored by
Visit Britain (United Kingdom)

Cooperating Organisations
Fraunhofer UK Research Ltd. (United Kingdom)
Future Photonics Hub (United Kingdom)
Knowledge Transfer Network (United Kingdom)
CENSIS (United Kingdom)
Association of Industrial Laser Users (United Kingdom)
Technology Scotland (United Kingdom)
Photonics Leadership Group (United Kingdom)

Published by
SPIE

Volume 11888

Proceedings of SPIE 0277-786X, V. 11888

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

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 *Space, Satellites, and Sustainability II*, edited by Mathew Williams, Callum J. Norrie, Kristina Tamane, Proc. of SPIE 11888, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510646254

ISBN: 9781510646261 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2021 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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 seven-digit CID article numbering system structured as follows:

- The first five 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

GLOBAL SUSTAINABILITY: CHALLENGES AND OPPORTUNITIES FOR SPACE AND SATELLITES

- 11888 04 **What might sustainability of the GEO region look like?** [11888-3]
- 11888 08 **Sharing insights from decommissioning in the space and nuclear industries** [11888-7]

SATELLITE DATA FOR SUSTAINABILITY: SOLUTIONS AT SCALE

- 11888 0A **Quantifying the carbon balance of managed grasslands in near-real time and at field scale by using satellite data and biogeochemical modelling** [11888-9]
- 11888 0D **Farming from space: model-data fusion approaches for simulating crop nitrogen and yield estimates** [11888-12]

POSTER SESSION

- 11888 0E **Calculation of the lidar signal by the DDA method applied to the data of satellite remote sensing of cirrus clouds for climate change detection** [11888-18]

SATELLITE MISSIONS FOR SUSTAINABILITY: NEW ASSETS AND CAPABILITY

- 11888 0F **Pre- and post-storm hurricane monitoring via data-driven SAR-based analytics (Keynote Paper)** [11888-13]
- 11888 0G **Optimising remotely sensed land cover classification for habitat mapping in complex Scottish upland landscapes** [11888-14]
- 11888 0H **Modelling nighttime air temperature from remote sensing imagery and GIS data** [11888-15]