SPIE. SENSORS+ IMAGING

SPIE Remote Sensing | SPIE Security + Defence

3–6 SEPTEMBER 2023 | RAI AMSTERDAM | AMSTERDAM, NETHERLANDS

SPIE. SENSORS+ IMAGING

SPIE Remote Sensing | SPIE Security + Defence

The premier annual European event that showcases the latest sensor and photonic technologies for imaging and monitoring the Earth's atmosphere and environment, as well as sensor technologies that address homeland security, defence, and counterterrorism.

Conferences: 3–6 September 2023
Exhibition: 4–5 September 2023

RAI Amsterdam
Amsterdam, Netherlands

Download the
SPIE Conference and Exhibition App

Download the free mobile app to enrich your meeting experience. View events, exhibitors and connect with participants all in the palm of your hand. The app is free, easy to use, and loaded with features designed for planning and connecting on the go.

Make the most of your time with these app features:

» Real-time programme updates
» Customize your schedule
» Organize your meeting notes
» Add new connections to your contacts
» Plan exhibitor visits
» Navigate the venue
» Bookmark specific research
» Create meeting reports
» And a whole lot more.

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Cranfield University

Experience the energy of Sensors + Imaging

Get ready to enjoy real conversations, hear the latest breakthroughs, and make importaant connections in person. Hear cutting-edge research in the latest sensor and photonic technologies for imaging and monitoring the Earth's atmosphere and environment, as well as sensor technologies that address homeland security, defence, and counterterrorism, and more. Attend technical presentations, free exhibition, plenary presentations, and a variety of networking activities.
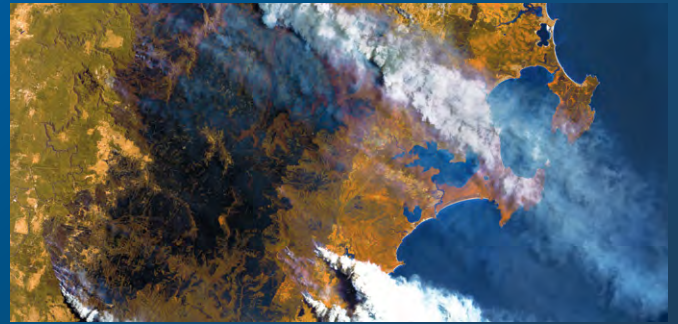
Remote Sensing Technical Conference Overview—PAGES 8-11

Technical Conferences—PAGES 25–59

Sensor and photonic technologies for imaging and monitoring the Earth's atmosphere and environments.

Security + Defence Technical Conference Overview—PAGES 12–15

Technical Conferences—PAGES 60–79

Photonic technologies that address homeland security, defence, and counterterrorism.

Plenary Sessions—PAGE 8

Presentations by leading speakers from across the globe.

Technical Events—PAGE 7

Social and Networking Events—PAGE 7

EXHIBITION—PAGES 16-20

The free exhibition will runs 4–5 September 2023 offering a look at innovative technologies from detectors and sensors to lasers and imaging equipment.
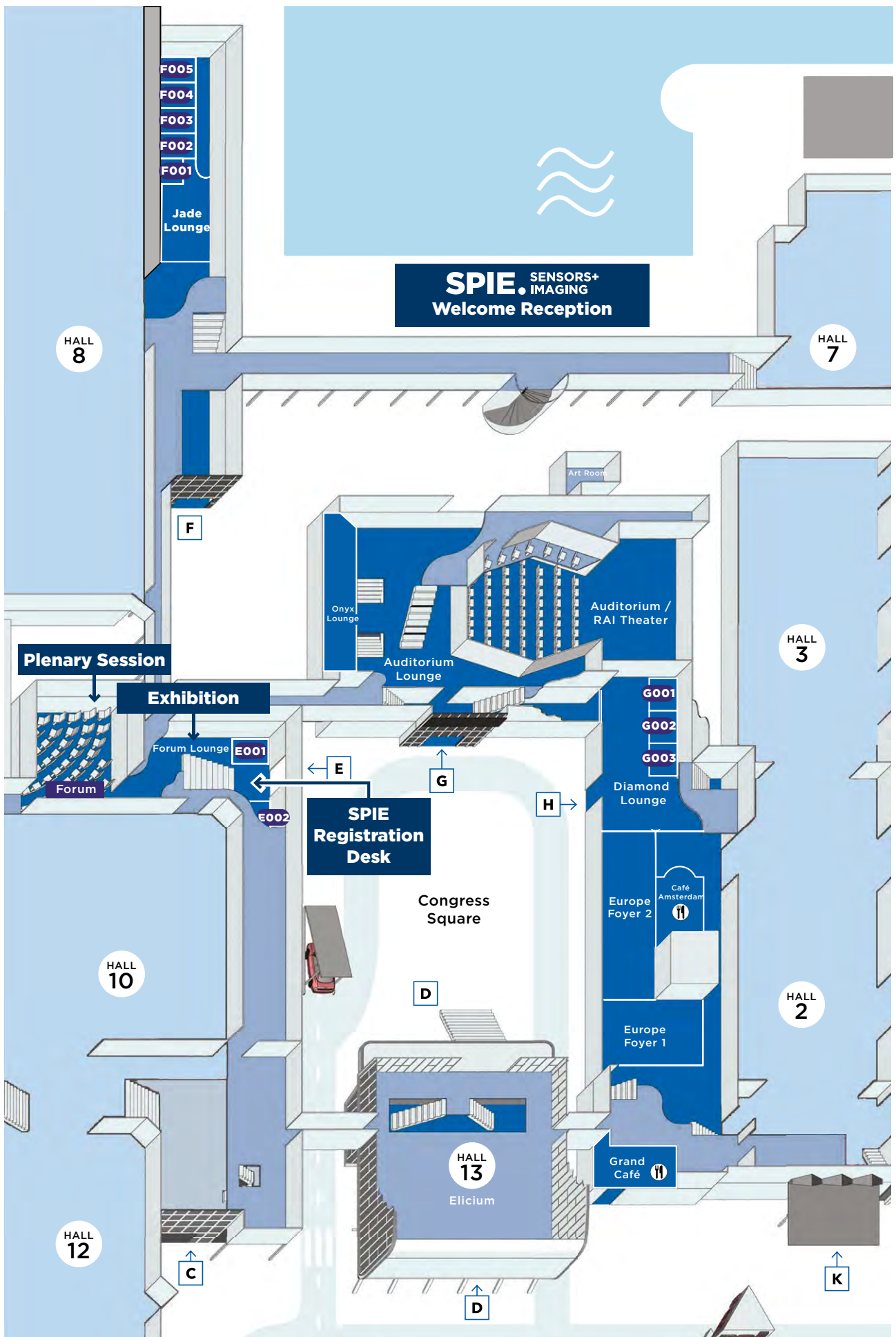
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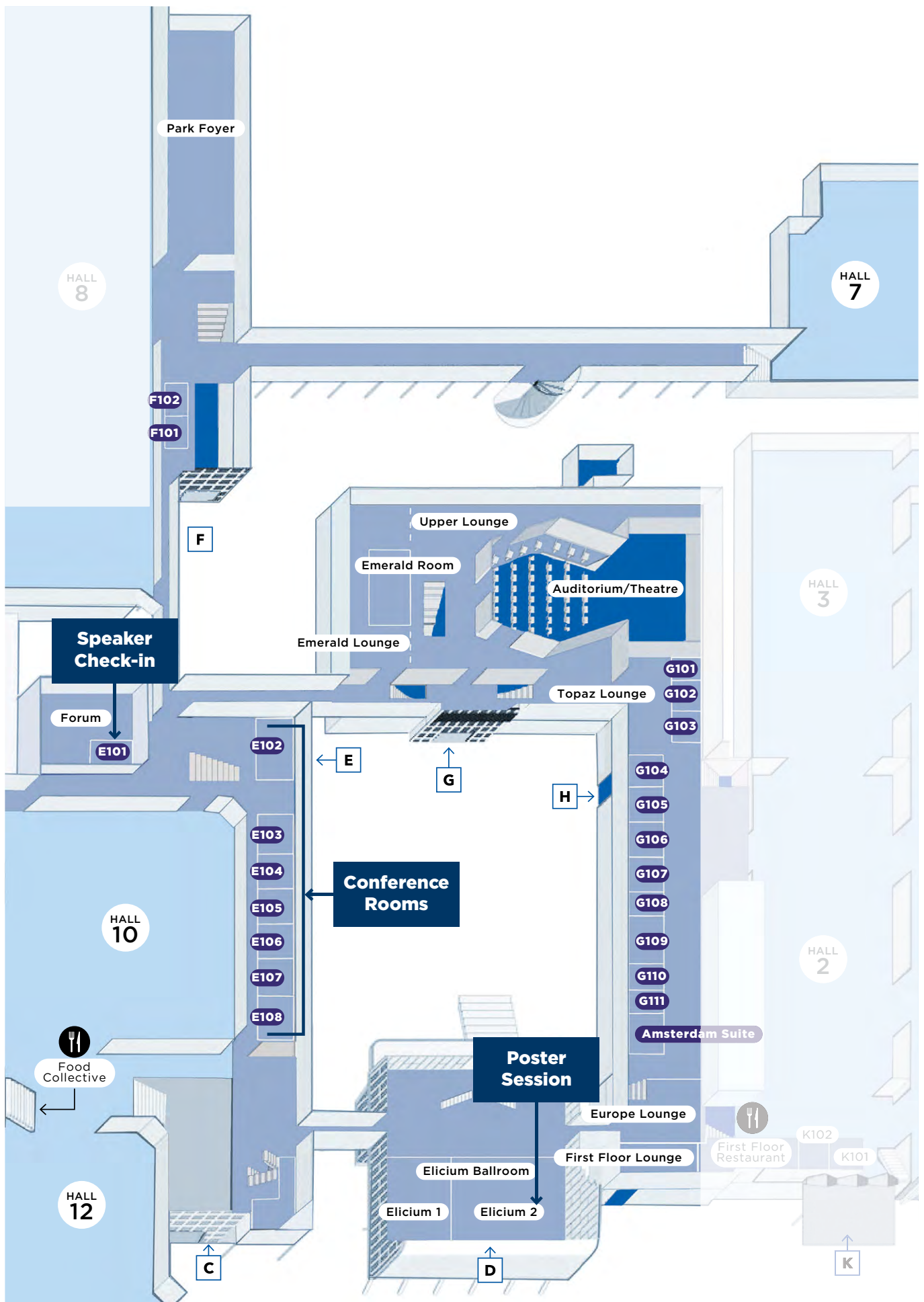
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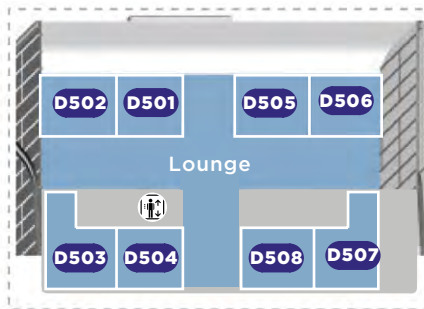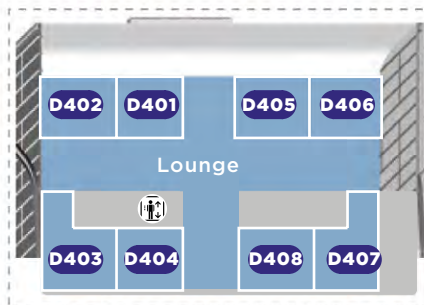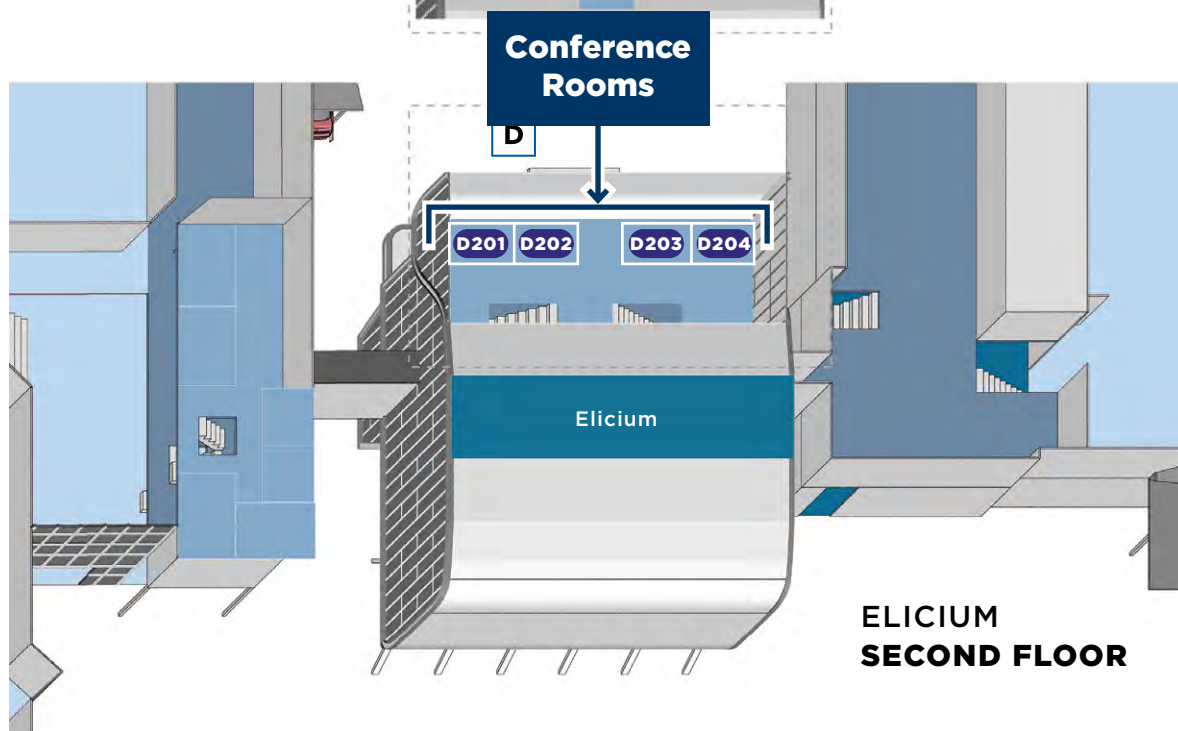
F005
F004
F003
F002
F001

Jade Lounge

HALL 8

SPIE. SENSORS+ IMAGING
Welcome Reception

HALL 7

F

Art Room

Onyx Lounge

Auditorium / RAI Theater

Auditorium Lounge

HALL 3

Plenary Session

Exhibition

Forum Lounge E001

Forum

G001
G002
G003

Diamond Lounge

E

G

E002

H

SPIE Registration Desk

Congress Square

Café Amsterdam

Europe Foyer 2

HALL 10

D

HALL 2

Europe Foyer 1

HALL 13
Elicium

Grand Café

HALL 12

C

D

K

Park Foyer

HALL 8

HALL 7

F102

F101

F

Upper Lounge

Emerald Room

Auditorium/Theatre

HALL 3

Emerald Lounge

Speaker Check-in

G101

G102

Topaz Lounge

G103

Forum

E101

E102

E

G

G104

H

G105

E103

G106

E104

Conference Rooms

G107

E105

G108

HALL 10

E106

G109

E107

G110

E108

G111

Amsterdam Suite

Food Collective

Poster Session

Europe Lounge

First Floor Restaurant

K102

First Floor Lounge

K101

HALL 12

Elicium Ballroom

Elicium 1

Elicium 2

C

D

K

HALL 2

ELICIUM

ELICIUM
FIFTH FLOOR

D502 D501 D505 D506
Lounge
D503 D504 D508 D507

ELICIUM
FOURTH FLOOR

D402 D401 D405 D406
Lounge
D403 D404 D408 D407

ELICIUM
THIRD FLOOR

D301 D302 D303 D304
Lounge

Conference Rooms

D

D201 D202 D203 D204

Elicium

ELICIUM
SECOND FLOOR

GENERAL INFORMATION

Badge pick up and registration hours
Location: Forum Lounge, Entrance E

Sunday, 3 September	8:00 - 17:30
Monday, 4 September	07:45 - 17:00
Tuesday, 5 September	08:00 - 17:00
Wednesday, 6 September	08:00 - 16:00

Exhibition hours
Location: Forum Lounge, Entrance E

Monday, 4 September	10:00 - 17:00
Tuesday, 5 September	10:00 - 16:00

SPIE Cashier
Location: Registration Area.

Open during registration hours.

Receipt and Certificate of Attendance
Preregistered attendees who need an stamped receipt or attendees who need a Certificate of Attendance may obtain those at the Cashier.

Badge corrections
Badge corrections can be made at the Cashier. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

Speaker check-in and preview station
Location: Room E101

Sunday through Wednesday	07:30 - 17:00

Speakers are not able to present using their own devices. All conference rooms are equipped with a computer workstation, projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to their conference room during the breaks with their memory devices or laptops to confirm their presentation display settings.

SPIE will record the audio plus screen content of all presentations; Recordings will be published on the SPIE Digital Libary.

Internet access
Complimentary wireless internet access will be available; connection speed depends on the number of users. Please read the SPIE Wireless Service Policy.

Login details and password are available at the Registration Desk.

SPIE Conference and Exhibition App
This useful tool allows you to search and browse the programme, special events, participants, exhibitors, courses, and more. It is free and available for iPhone and Android phones. If you don't already have the app you can download it here: download the SPIE app.

SPIE luggage and coat check
Location: next to the SPIE registration desk

Open during registration hours.

Complimentary luggage, package, and coat storage are available. Please note opening hours.

SPIE Family Care Grants
Did you know SPIE offers Family Care Grants to SPIE member? For more information on deadlines and how to apply check the details here.

Quiet Room
Location: Please request key from Registration Desk

The Quiet Room is intended for silent meditation, reflection, and prayer. No mobile devices or computer use is allowed, and no food nor beverages are allowed.

Lost and found
Location: SPIE Cashier

Found items will be kept at the SPIE Cashier in the Registration area during the meeting and available only during registration hours. At the Clarion Hotel security services.

Urgent message line
Messages for attendees can be left by calling +44 29 2089 4747. Message will be taken during registration hours Sunday - Wednesday. It is the attendees' responsibility to check the message board on a regular basis.

Food and beverage services

Coffee Breaks Locations

Sunday: 13:00 - 17:00	Ruby Lounge
Monday - Wednesday, 07:00 - 16:00	Forum Lounge

Restaurant and city information
Amsterdam has a huge selection of restaurants in the city centre. Please use a tool such as Trip Advisor to narrow down your selection.

PLENARY SESSION

Hear from world-class speakers on research challenges and breakthroughs

Open to all paid conference attendees.

Sensors + Imaging Plenary Session
4 September 2023 • 16:00–18:25 | Forum

Join us for exciting plenary lectures featuring presentations from a wide range of leaders in the field, highlighting design, fabrication, and defence and security system integration.

16:00–16:10
Welcome and Introduction

16:10–16:55
A Dutch perspective on space situational awareness (SSA) for defence

Marko Noppen
MoD, Defence Space Security Ctr.
(Netherlands)

Ivan Ferrario
TNO
(Netherlands)

With the recent establishment of the Dutch Defence Space Security Center (DSSC), the MoD is tasked with the development of Space Situational Awareness for which a variety of systems are required. A breakdown of the need for SSA from a MoD perspective will be provided as well as how the DSSC strives to develop this capability. Further a brief insight towards future requirements will be given as well as how new technologies can help a relatively small MoD with developing relevant assets that directly support operations. Cooperation is sought with institutes and industry in order to develop the relevant knowledge, technologies and capabilities. Finally an overview of the Netherlands SSA ecosystem will be given. In particular the Netherlands Organisation for Applied Scientific Research (TNO) will present the optomechanical instruments and sensors for both ground and space SSA applications which is currently developing and testing.

16:55–17:40
Meaningful control of intelligent systems

Peter Werkhoven
TNO
(Netherlands)

The rapid evolution of AI technology is well on its way to being able to support and even replace humans in various tasks. Exploiting the application potential, with simultaneous mitigation of the (systemic) risks to our society is proving to be a major challenge. How do we tell (autonomous) AI systems effectively what to do? How do we make them function in a responsible and morally acceptable way? To what extent can we demand explainability?

17:40–18:25
The ESA Earth Observation Programme: highlights, opportunities and challenges

Nicolaus Hanowski
ESRIN, European Space Agency
(Italy)

Recently, ESA Member States have subscribed to funding Earth Observation activities on the scale of 2.7 billion Euros over the next 3 years. Corresponding workplans have been approved in early 2023 and numerous activities in the domain of Earth Observation satellites, ground segments, data management, science and applications are proceeding and are now open for participation

TECHNICAL EVENTS

Connect with your colleagues and explore topics in depth. Events may include technical networking sessions, workshops, and poster sessions.
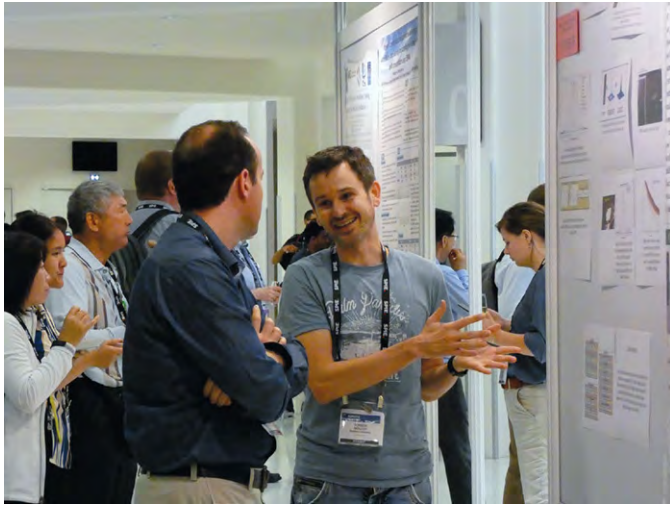
Poster Session

5 September 2023 • 17:15–19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster Setup: Tuesday 10:00 AM - 5:00 PM

Poster authors, view poster presentation guidelines and set-up instructions at https://spie.org/ESI/poster-presentation-guidelines.

PANEL DISCUSSION
Laser Weapons and Lasers Used as Weapons against Personnel

5 September 2023 • 17:20–17:50 | Room E103

Join us for an insightful discussion focusing on laser weapons and lasers used as weapons against personnel.

MODERATORS:
Robert J. Grasso, NASA Goddard Space Flight Ctr. (United States)
Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
Gareth D. Lewis, Royal Military Academy (Belgium)

SOCIAL AND NETWORKING EVENTS

Connect with colleagues in variety of ways throughout the week.

Welcome Reception

4 September 2023 • 18:45–20:45
Boat House, Strandzuid

Relax, socialize and network with your colleagues. All registered attendees are invited to join this welcome reception, which takes place in the grounds of the RAI centre.

SPIE Remote Sensing

TIME	Conference 12727 **Remote Sensing for Agriculture, Ecosystems, and Hydrology XXV** Chairs: Christopher M. U. Neale; Antonino Maltese Location: E102	Conference 12728 **Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2023** Chairs: Charles R. Bostater Jr.; Xavier Neyt Location: D204	Conference 12729 **Sensors, Systems, and Next-Generation Satellites XXVII** Chairs: Sachidananda R. Babu; Arnaud Hélière; Toshiyoshi Kimura Location: E104	Conference 12730 **Remote Sensing of Clouds and the Atmosphere XXVIII** Chairs: Adolfo Comerón; Evgueni I. Kassianov; Klaus Schäfer; Richard H. Picard; Konradin Weber Location: D204 (Tue) & E105-106 (Wed)
3 September 2023				
AFTERNOON	13:20 - 15:00 Session 1: Machine Learning and Deep Learning I		13:00 - 15:00 Session 1: US Missions and Technology I	
	15:00 - 15:30 Coffee Break		15:00 - 15:30 Coffee Break	
	15:30–17:30 Session 2: Surface, Coastal, and Ground Water		15:30 - 17:20 Session 2: European Missions and Technology I	
4 September 2023				
MORNING	9:10 - 10:10 Session 3: Forest Mapping and Monitoring I	08:50 - 10:00 Session 1: Sentinel-related Satellite Science	08:30 - 10:00 Session 3: Japanese Missions and Technology I	
	10:10 - 10:40 Coffee Break	10:00 - 10:30 Coffee Break	10:00 - 10:30 Coffee Break	
	10:40 - 12:00 Session 4: Forest Mapping and Monitoring II	10:30 - 12:20 Session 2: Upper Water-Column Sensing	10:30 - 11:50 Session 4: Japanese Missions and Technology II	
AFTERNOON	12:00 - 13:30 Lunch/Exhibition Break	12:20 - 13:30 Lunch/Exhibition Break	11:50 - 13:00 Lunch/Exhibition Break	
	13:30 - 15:30 Session 5: Agricultural Vegetation	13:30 - 15:50 Session 3: Water Systems Analysis Sensing	13:00 - 15:30 Session 5: US Missions and Technology II	
	15:30 - 16:00 Coffee Break	15:50 - 16:00 Coffee Break	15:30 - 16:00 Coffee Break	
16:00 - 18:15 Location: Forum	**Sensors + Imaging Plenary Session** 16:00–16:10: **Welcome and Introduction** 16:10–16:55: **A Dutch perspective on space situational awareness (SSA) for defence,** Marko Noppen, MoD, Defence Space Security Ctr. (Netherlands); **Ivan Ferrario,** TNO (Netherland 16:55-17:40: **Meaningful control of intelligent systems,** Peter Werkhoven, TNO (Netherlands) 17:40–18:25: **The ESA Earth Observation Programme: highlights, opportunities and challenges,** Nicolaus Hanowski, ESRIN (Italy)			

2023 Sensors + Imaging Symposium Chairs

Ric Schleijpen
TNO Defence, Security and Safety (Netherlands)

Lorenzo Bruzzone
Remote Sensing Co-chair
Univ. degli Studi di Trento (Italy)

Conference 12731 **Environmental Effects on Light Propagation and Adaptive Systems VI** Chairs: Karin Stein; Szymon Gladysz Location: E107	Conference 12732 **Microwave Remote Sensing: Data Processing and Applications II** Chairs: Fabio Bovenga; Claudia Notarnicola; Nazzareno Pierdicca; Emanuele Santi Location: E105-106	Conference 12733 **Image and Signal Processing for Remote Sensing XXIX** Chairs: Lorenzo Bruzzone; Francesca Bovolo; Jon Atli Benediktsson Location: E105-106	Conference 12734 **Earth Resources and Environmental Remote Sensing/GIS Applications XIV** Chairs: Karsten Schulz; Ulrich Michel; Konstantinos G. Nikolakopoulos Location: D201	Conference 12735 **Remote Sensing Technologies and Applications in Urban Environments VIII** Chairs: Thilo Erbertseder; Nektarios Chrysoulakis; Ying Zhang Location: E103
			3 September 2023	
			13:40 - 15:00 Session 1: Environmental Monitoring Concepts I	13:00 - 15:00 Session 1: Urban Planning
			15:00 - 15:30 Coffee Break	15:00 - 15:30 Coffee Break
			15:30 - 16:50 Session 2: Environmental Monitoring Concepts II	15:30 - 17:10 Session 2: Smart Cities
			4 September 2023	
		09:00 - 10:20 Session 1: Pansharpening and Spatial Enhancement	09:00 - 10:00 Session 3: Sensors and Platforms	09:00 - 10:20 Session 3: Urban Air Quality I
		10:20 - 10:50 Coffee Break	10:00 - 10:30 Coffee Break	10:20 - 10:50 Coffee Break
		10:50 - 12:10 Session 2: Image Pre-processing	10:30 - 11:40 Session 4: Infrastructures and Urban Areas	10:50 - 12:30 Session 4: Urban Air Quality II
		12:10 - 14:00 Lunch/Exhibition Break	11:40 - 13:10 Lunch/Exhibition Break	12:30 - 13:50 Lunch/Exhibition Break
		14:00 - 15:20 Session 3: Change Detection and Damage Assessment	13:10 - 15:10 Session 5: Processing Methodologies	13:50 - 15:30 Session 5: Urban Climate
		15:20 - 16:00 Coffee Break	15:10 - 16:00 Coffee Break	15:30 - 16:00 Coffee Break

16:00 - 18:15 Location: Forum	**Sensors + Imaging Plenary Session** 16:00–16:10: **Welcome and Introduction** 16:10–16:55: **A Dutch perspective on space situational awareness (SSA) for defence,** Marko Noppen, MoD, Defence Space Security Ctr. (Netherlands); **Ivan Ferrario,** TNO (Netherland 16:55-17:40: **Meaningful control of intelligent systems,** Peter Werkhoven, TNO (Netherlands) 17:40–18:25: **The ESA Earth Observation Programme: highlights, opportunities and challenges,** Nicolaus Hanowski, ESRIN (Italy)

SPIE. DIGITAL LIBRARY

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50 proceedings downloads

Paid registration includes 50 content downloads from the SPIE Digital Library. SPIE will email details on using proceedings download tokens.

See full details and updates at **spie.org/esi** or on the **SPIE App**

SPIE Remote Sensing

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5 September 2023				
MORNING	10:30 - 11:50 Session 6: Machine Learning and Deep Learning II		10:40 - 12:10 Session 6: European Missions and Technology II	09:00 - 10:20 Session 1: Remote Sensing of Clouds, Aerosols, Trace Gases and Meteorological Parameters I
				10:20 - 10:50 Coffee Break
	11:50- 12:30 Sess ion 7: Wildfire Monitoring			10:50 - 12:40 Session 2: Remote Sensing of Clouds, Aerosols, Trace Gases and Meteorological Parameters II
AFTERNOON	12:30 - 13:50 Lunch/Exhibition Break		12:10 - 13:40 Lunch/Exhibition Break	12:40 - 14:00 Lunch/Exhibition Break
	14:00 - 14:40 Session 8: Hyperspectral, High Spatial Resolution		13:40 - 15:00 Session 7: Smallsat	14:00 - 15:20 Session 3: Radiative Transfer and Applications
	14:40 - 16:50 Session 9: Energy Balance, Evapotranspiration			
	15:20 - 15:50 Coffee Break		15:00 - 15:30 Coffee Break	15:20 - 15:50 Coffee Break
				15:50 - 17:10 Session 4: Technologies, Techniques and Algorithms for Active and Passive Remote Sensing I
17:15 - 19:00	**POSTERS-TUESDAY**			
6 September 2023				
MORNING	9:00–10:20 Session 10: Machine Learning and Deep Learning III		09:00 - 10:30 Session 9: On Ground and On Orbit Calibration II	08:30 - 10:10 Session 5: Technologies, Techniques and Algorithms for Active and Passive Remote Sensing II
	10:20–10:50 Coffee Break		10:30 - 11:00 Coffee Break	10:10 - 11:00 Coffee Break
	10:50–12:10 Session 11: UAV, LIDAR, and Smart Solutions for Farming		11:00 - 12:20 Session 10: On Ground and On Orbit Calibration III	
AFTERNOON	12:10–13:30 Lunch Break			
	13:30–15:10 Session 12: Environmental Remote Sensing			

Conference 12731 **Environmental Effects on Light Propagation and Adaptive Systems VI** Chairs: Karin Stein; Szymon Gladysz Location: E107	Conference 12732 **Microwave Remote Sensing: Data Processing and Applications II** Chairs: Fabio Bovenga; Claudia Notarnicola; Nazzareno Pierdicca; Emanuele Santi Location: E105-106	Conference 12733 **Image and Signal Processing for Remote Sensing XXIX** Chairs: Lorenzo Bruzzone; Francesca Bovolo; Jon Atli Benediktsson Location: E105-106	Conference 12734 **Earth Resources and Environmental Remote Sensing/GIS Applications XIV** Chairs: Karsten Schulz; Ulrich Michel; Konstantinos G. Nikolakopoulos Location: D201	Conference 12735 **Remote Sensing Technologies and Applications in Urban Environments VIII** Chairs: Thilo Erbertseder; Nektarios Chrysoulakis; Ying Zhang Location: E103
5 September 2023				
THIS YEAR'S CONFERENCE IS DEDICATED TO THE MEMORY OF: **Anton Kohnle,** retired, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)		08:30 - 10:10 Session 4: Deep Learning for Image Classification and Regression	09:00 - 10:00 Session 6: Remote Sensing for Archaeology, Preservation of Cultural and Natural Heritage	
		10:10 - 10:40 Coffee Break	10:00 - 10:30 Coffee Break	
		10:40 - 12:20 Session 5: Object Detection and Unmixing	10:30 - 12:10 Session 7: Satellite RS and Ground-based Nondestructive Technologies in Civil and Environmental Engineering I	
		12:20 - 13:50 Lunch/Exhibition Break	12:10 - 13:30 Lunch/Exhibition Break	
13:10 - 15:00 Session 1: Tribute to Anton Kohnle: In-Memoriam Session		13:50 - 15:30 Session 6: Accuracy Assessment and Big Data Analysis	13:30 - 15:10 Session 8: Satellite RS and Ground-based Nondestructive Technologies in Civil and Environmental Engineering II	
15:30 - 16:00 Coffee Break		15:30 - 16:00 Coffee Break	15:10 - 15:40 Coffee Break	
15:30 - 17:00 Session 2: Field Trial of NATO SET 304		16:00 - 17:00 Session 7: SAR and Radar Data Analysis	15:40 - 17:40 Session 9: Hazard Mitigation Geologic Applications	
POSTERS-TUESDAY				
6 September 2023				
09:00 - 10:00 Session 3: Propagation in Maritime Environment				
10:00 - 10:30 Coffee Break				
10:30 - 11:40 Session 4: Field Trials	11:00 - 12:00 Session 1: Environmental Applications			
11:40 - 13:30 Lunch Break	12:00 - 13:20 Lunch Break			
13:30 - 15:00 Session 5: Turbulence Mitigation	13:20 - 15:00 Session 2: SAR Interferometry			
15:00 - 15:30 Coffee Break	15:00 - 15:30 Coffee Break			
15:30 - 16:30 Session 6: Numerical Weather Prediction and Wave Optics Simulations	15:30 - 16:50 Session 3: SAR and Radiometry Applications			
16:30 - 17:10 Session 7: Free-space Optical Communications				

SPIE Security + Defence

TIME	Conference 12736 **Target and Background Signatures IX** Chairs: Karin Stein; Ric Schleijpen Location: E108	Conference 12737 **Electro-optical and Infrared Systems: Technology and Applications XX** Chairs: Duncan L. Hickman; Helge Bürsing; Gary W. Kamerman; Ove Steinvall Location: D203	Conference 12738 **Technologies for Optical Countermeasures XIX** Chairs: Robert J. Grasso; Marc Eichhorn; Gareth D. Lewis Location: E103	Conference 12739 **High Power Lasers: Technology and Systems, Platforms, Effects VI** Chairs: Harro Ackermann; Willy L. Bohn Location: E103
3 September 2023				
AFTERNOON	13:45 - 13:50 Welcome and Opening Remarks	13:30 - 15:10 Session 1: Sensors and Technology I		
	3:50 - 15:00 Session 1: AI and Counter-AI			
	15:00 - 15:30 Coffee Break	15:10 - 15:40 Coffee Break		
	15:30 - 16:40 Session 2: Scene Generation	15:40 - 16:50 Session 2: Sensors and Technology II		
4 September 2023				
MORNING	08:30 - 10:20 Session 3: Surface Materials	09:20 - 11:30 Session 3: Active Imaging and Laser Applications		
	10:20 - 10:50 Coffee Break	10:20 - 10:50 Coffee Break		
	10:50 - 12:00 Session 4: Monitoring Signature and Environment	Session 3: (continued)		
AFTERNOON	12:00 - 13:40 Lunch/Exhibition Break	11:30 - 13:00 Lunch/Exhibition Break		
	13:40 - 15:30 Session 5: Detection and Performance of Humans and Sensors	13:00 - 15:30 Session 4: Systems and Applications I		
	15:30 - 15:35 Closing Remarks	15:30 - 16:00 Coffee Break		
16:00 - 18:15 Location: Forum	**Sensors + Imaging Plenary Session** 16:00–16:10: **Welcome and Introduction** 16:10–16:55: **A Dutch perspective on space situational awareness (SSA) for defence,** Marko Noppen, MoD, Defence Space Security Ctr. (Netherlands); **Ivan Ferrario,** TNO (Netherland 16:55-17:40: **Meaningful control of intelligent systems,** Peter Werkhoven, TNO (Netherlands) 17:40–18:25: **The ESA Earth Observation Programme: highlights, opportunities and challenges,** Nicolaus Hanowski, ESRIN (Italy)			
5 September 2023				
MORNING		09:00 - 10:30 Session 5: Modelling and Simulation I	08:30 - 08:40 Welcome and Opening Remarks	
			08:40 - 10:00 Session 1: Keynote	
		10:30 - 11:00 Coffee Break	10:00 - 10:30 Coffee Break	

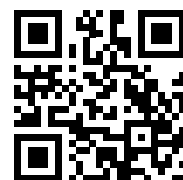| Conference 12740 **Emerging Imaging and Sensing Technologies for Security and Defence VIII** Chairs: Gerald S. Buller; Paul M. Alsing; Neil A. Salmon; Richard C. Hollins; Robert A. Lamb; Martin Laurenzis; Michael L. Fanto; Philip Walther; Frank Gumbmann Location: E107	Conference 12741 **Advanced Materials, Biomaterials, and Manufacturing Technologies for Security and Defence** Chairs: Chantal Andraud; Roberto Zamboni; Attila Szep; Andrea Camposeo; Luana Persano Location: E107	Conference 12742 **Artificial Intelligence for Security and Defence Applications** Chairs: Henri Bouma; Judith Dijk; Radhakrishna Prabhu; Robert James Stokes; Yitzhak Yitzhaky Location: D202
3 September 2023		
	14:00 - 14:10 Opening Remarks	
	14:10 - 16:50 Session 1: Biotronics	
	15:20 - 15:50 Coffee Break	
	15:50 - 16:50 Session 1 (continued)	
4 September 2023		
	09:00 - 12:10 Session 2: Photonics, Smart Materials	08:40 - 10:00 Session 1: Privacy, Identification and Recognition
	10:00 - 10:30 Coffee Break	10:10 - 10:40 Coffee Break
	10:30 - 12:10 Session 2 (continued)	10:40 - 12:00 Session 2: Surveillance
	12:10 - 13:30 Lunch/Exhibition Break	12:00 - 13:40 Lunch/Exhibition Break
	13:30 - 15:20 Session 3: Sensors	13:40 - 15:00 Session 3: Detection and Tracking
	15:20 - 16:00 Coffee Break	15:00 - 16:00 Coffee Break
	15:20 - 15:30 Adjourn	
16:00 - 18:15 Location: Forum	**Sensors + Imaging Plenary Session** 16:00–16:10: **Welcome and Introduction** 16:10–16:55: **A Dutch perspective on space situational awareness (SSA) for defence,** Marko Noppen, MoD, Defence Space Security Ctr. (Netherlands); **Ivan Ferrario,** TNO (Netherland 16:55-17:40: **Meaningful control of intelligent systems,** Peter Werkhoven, TNO (Netherlands) 17:40–18:25: **The ESA Earth Observation Programme: highlights, opportunities and challenges,** Nicolaus Hanowski, ESRIN (Italy)	
5 September 2023		
	09:00 - 09:05 Welcome	09:00 - 10:10 Session 4: Object Detection and Tracking
	09:05 - 10:10 Session 4: Advanced Manufacturing Technologies for Micro- and Nanosystems I	
	10:10 - 10:40 Coffee Break	10:10 - 10:40 Coffee Break

SPIE Security + Defence

TIME	Conference 12736 **Target and Background Signatures IX** Chairs: Karin Stein; Ric Schleijpen Location: E108	Conference 12737 **Electro-optical and Infrared Systems: Technology and Applications XX** Chairs: Duncan L. Hickman; Helge Bürsing; Gary W. Kamerman; Ove Steinvall Location: D203	Conference 12738 **Technologies for Optical Countermeasures XIX** Chairs: Robert J. Grasso; Marc Eichhorn; Gareth D. Lewis Location: E103	Conference 12739 **High Power Lasers: Technology and Systems, Platforms, Effects VI** Chairs: Harro Ackermann; Willy L. Bohn Location: E103
MORNING (continued)		11:00 - 12:00 Session 6: Systems and Applications II	10:30 - 12:30 Session 2: Laser Effects	
AFTERNOON		12:00 - 13:30 Lunch/Exhibition Break	12:30 - 13:40 Lunch/Exhibition Break	
		13:30 - 15:00 Session 7: Laser Sensing	13:40 - 14:30 Session 3: Beam Steering, Pointing and Control	
			14:30 - 15:30 Session 4: Laser Sources and Power Scaling	
		15:00 - 15:30 Coffee Break	15:30 - 16:00 Coffee Break	
		15:30 - 17:00 Session 8: Passive EO Sensing	16:00 - 17:20 Session 5: Laser against Personnel	
			17:20 - 17:50 Panel Discussion: Laser Weapons and Lasers Used as Weapons against Personnel	
			17:50 - 17:55 Closing Remarks	
17:15 - 19:00	**POSTERS-TUESDAY**			
6 September 2023				
MORNING				08:45 - 08:50 Welcome and Opening Remarks
				08:50 - 10:30 Session 1: Architectures for Power Scaling
				10:30 - 11:00 Coffee Break
				11:00 - 13:00 Session 2: Fiber Lasers and Beam Combination
AFTERNOON				13:00 - 14:10 Lunch/Exhibition Break
				14:10 - 16:40 Session 3: Laser Effects and Safety Issues
				14:50 - 15:20 Coffee Break
				15:20 - 16:40 Session 3: (continued)

Conference 12740 **Emerging Imaging and Sensing Technologies for Security and Defence VIII** Chairs: Gerald S. Buller; Paul M. Alsing; Neil A. Salmon; Richard C. Hollins; Robert A. Lamb; Martin Laurenzis; Michael L. Fanto; Philip Walther; Frank Gumbmann Location: E107	Conference 12741 **Advanced Materials, Biomaterials, and Manufacturing Technologies for Security and Defence** Chairs: Chantal Andraud; Roberto Zamboni; Attila Szep; Andrea Camposeo; Luana Persano Location: E107	Conference 12742 **Artificial Intelligence for Security and Defence Applications** Chairs: Henri Bouma; Judith Dijk; Radhakrishna Prabhu; Robert James Stokes; Yitzhak Yitzhaky Location: D202
10:30 - 12:00 Session 1: LIDAR and Imaging	10:40 - 11:50 Session 5: Advanced Manufacturing Technologies for Micro- and Nanosystems II	10:40 - 11:20 Session 5: Explainability
		11:20 - 12:20 Session 6: Active Learning
12:00 - 13:20 Lunch/Exhibition Break		12:20 - 14:00 Lunch/Exhibition Break
13:20 - 15:30 Session 2: Quantum Sensing and Communications		14:00 - 14:30 Session 7: Image Enhancement
		14:30 - 16:40 Session 8: Simulation and Synthetic Data
15:30 - 16:00 Coffee Break		15:10 - 15:40 Coffee Break
16:00 - 17:20 Session 3: Novel Devices		15:40 - 16:40 Session 8 (continued)

POSTERS-TUESDAY		
6 September 2023		
09:00 - 10:10 Session 4: Emerging Devices		
10:10 - 10:40 Coffee Break		
10:40 - 12:30 Session 5: Novel Sensors and Phenomenology		

Exhibitor Directory

Monday 4 September 10:00–17:00
Tuesday 5 September 10:00–16:00
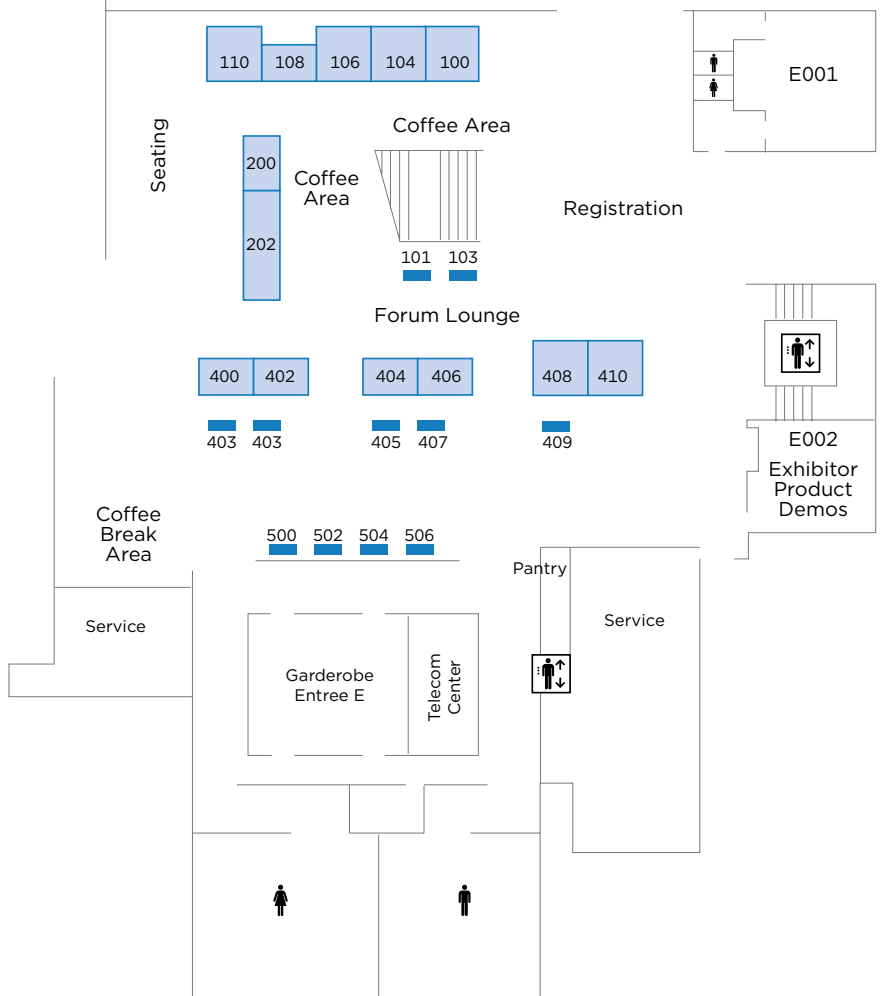
Booth numbers provided in the Exhibition Guide may be cross-referenced with the floor plan below. The address of each exhibitor is also listed, making this Exhibition Guide an excellent reference tool.

BOOTH # / EXHIBITOR

Booth	Exhibitor
100	HySpex Norsk Elektro Optikk As
101	EMBERION
103	NEW IMAGING TECHNOLOGIES
104	SVS-Vistek GmbH
106	CI SYSTEMS
108	SANDVIK OSPREY LTD
110	PowerPhotonic
200	ECREAM: Environmental and Agri-food Monitoring
202	Laser 2000 Benelux
400	Frankfurt Laser Company
400	mirSense
401	Caeleste CVBA
402	Videology Industrial-Grade Cameras
403	I-Photonics
404	National Institute of Environmental Research (NIER)
405	Spectrogon Ltd.
406	Nippon Electric Glass Co., Ltd.
407	TELOPS
408	HGH INFRARED SYSTEMS
409	Photon Force Ltd.
410	HAMAMATSU PHOTONICS Deutschland GmbH
500	ThermoAnalytics
504	SET
506	Cubert GmbH

Forum

Plenary Session

Seating

| 110 | 108 | 106 | 104 | 100 |

Coffee Area

200

Coffee Area

202

101   103

Forum Lounge

| 400 | 402 | | 404 | 406 | | 408 | 410 |

403 403   405 407   409

Coffee Break Area

Service

500 502 504 506

Garderobe Entree E

Telecom Center

Pantry

Service

E001

Registration

E

E002
Exhibitor Product Demos

EXHIBITOR LISTING

Caeleste CVBA #401
SPIE. CORPORATE MEMBER

Hendrik Consciencestraat 1B, Mechelen, 2800 Belgium
+32 15 71 05 03
sales@caeleste.be; www.caeleste.be

Caeleste a turn-key supplier of high-end, beyond state-of-the-art CMOS image sensors. Our activities include custom image sensor design, manufacture, assembly and characterization. Caeleste is the originator of many novel concepts as high-speed, low-noise image sensors, indirect X-ray detectors with photon counting, color X-ray sensors, and sub-0.5 noise electron read noise CMOS pixels. Caeleste is specialized in space and radiation hard design.

CI SYSTEMS #106
SPIE. CORPORATE MEMBER

6 Hamechkar Street , Industrial Park Ramant Gabriel, Migdal Ha'emek, 2306990 Israel
+972 4 644 8888
market@ci-systems.com; www.ci-systems.com

Featured Product: Spectral Projector System - https://www.ci-systems.com/spectral-target-projector

CI Systems has been a worldwide supplier of a wide range of electro-optical test and measurement equipment for nearly four decades.The company's presence with offices in three continents and network of experienced representatives in many regions of the globe provide our customers with the highest quality service possible. We present variety of products from the world's broadest selection of thermal and visible sources to sophisticated threat simulators. Contact: Eran Adler, Marketing & Sales Manager, adler.eran@ci-systems.com; Efraim Tzafrir, VP EO DIVISION MANAGER, market@ci-system.com

Cubert GmbH #506
SPIE. CORPORATE MEMBER

Science Park II, Lise-Meitner-Str. 8/1, Ulm, 89081 Germany
+49 731 70815600; fax +49 731 20642045
info@cubert-gmbh.de; www.cubert-hyperspectral.com

Founded in 2012, Cubert remains the exclusive producer of true hyperspectral video cameras using light field technology. Our cameras are utilized in environmental monitoring, UAV-based remote sensing for precision agriculture, industrial quality control, non-invasive life sciences, and biomedical imaging—ideal for clinical diagnosis. Cubert provides ready-made cameras, spectral imaging software, a comprehensive SDK, personalized product options, and application support.

ECREAM: Environmental and Agri-food Monitoring #200

Dr Rorig Damn 22, Paderborn, 33102 Germany
+49 5251 184 5331; fax +49 5251 184 5332
bruce@vividcomponents.co.uk; www.ecream.eu

ECREAM is a group of EU projects working in the area of environmental and food monitoring. To varying degrees, these projects all share objectives, technologies and partners and the group will work together to ensure compatibility of results, avoid duplication and share knowledge. At this event, researchers from the ECREAM projects: AEOLUS, h-ALO, PHOTON-FOOD and TRIAGE will be represented. Contact: Amir Khodabakhsh, Researcher, a.khodabakhsh@science.ru.nl; Stephan Schröder, Researcher, stephan.schroder@senseair.com

EMBERION #101
SPIE. CORPORATE MEMBER

Metsänneidonkuja 8, Espoo, 02130 Finland
+358 40 548 1663
sales@emberion.com; www.emberion.com

Featured Product: Wide spectral (400-2000)nm and high dynamica range GigE Vis-SWIR camera

Emberion designs and manufactures high-performance sensors by integrating quantum dots & nanomaterials and in-house designed CMOS ROIC. Our new product variant Emberion VS20 GigE wide spectrum from Vis-SWIR (400-2000)nm and high dynamic range cameras/camera cores target various applications such as machine vision (plastic recycling , food sorting),surveillance and enable hyperspectral imaging. We are also developing novel MWIR and ultrawide band (Vis-SWIR-Thermal) range sensors and cameras. Contact: Bruce Barnett, Sales Managers, bruce.barnett@emberion.com

Frankfurt Laser Company #400
SPIE. CORPORATE MEMBER

An den 30 Morgen 13, Friedrichsdorf, 61381 Germany
+49 6172 27978 0
sales@frlaserco.com; www.frlaserco.com

FLC is a private company engaged in development, production & distribution of: FP, DFB & DBR laser diodes, SM individually addressable & broad area laser diode arrays, superluminescent diodes in the wavelength range from 405nm to 6μm, VCSELs & Quantum Cascade Lasers. FLC also supplies laser diode modules, free space & fiber-coupled, CW and Q-switched DPSS lasers and OEM modules. Its products cover 266nm to 17.2μm wavelength and 1mW to 3KW power range. Contact: Vsevolod Mazo, Sales Director, sales@frlaserco.com; Stefan Meier, Sales and Product Manager, stefan.meier@frlaserco.com

SPONSOR

HAMAMATSU PHOTONICS Deutschland GmbH #410
SPIE. CORPORATE MEMBER

Arzbergerstr 10, Herrsching, 82211 Germany
+49 8152 375 0
info@hamamatsu.de; www.hamamatsu.de

Hamamatsu Photonics is a leading provider of cutting-edge photonics technology and products. With 70 years of experience, the company delivers innovative solutions to customers across a wide range of industries, including medical, scientific research, industrial, and telecommunications. More information at www.hamamatsu.com Contact: Arie van Gool, Sales Manager, avangool@hamamatsu.de; Christoph Seibel, Group Leader Academic, cseibel@hamamatsu.de

HGH INFRARED SYSTEMS #408

10 rue Maryse Bastié, Igny, 91430 France
+33 169354617
soukaina.ettalhi@hgh-infrared.com; www.hgh-infrared.com

Featured Product: Test any Electro-Optical system and customize your benches with the new Infratest software packages

HGH provides leading-edge electro-optical test solutions: blackbodies, visible to SWIR sources, high-performance collimators, customized test benches for cameras, detectors and other EO systems figures among the sharp expertise HGH offers to universities, research labs, EO systems manufacturers and test centers. At SPIE Sensors + Imaging 2023, HGH will showcase the new generation of our EO testing software Infratest. Contact: JULIA KNOTHE, Export Sales Engineer – Test & Measurement, julia.knothe@hgh-infrared.com; CATHERINE BARRAT, Test & Measurement Manager, catherine.barrat@hgh-infrared.com

EXHIBITOR LISTING

HySpex Norsk Elektro Optikk As #100

SPIE. CORPORATE MEMBER

Østensjøveien 34, Oslo, 0667 Norway
+47 40 00 18 58
hyspexsales@neo.no; www.hyspex.com

Featured Product: HySpex hyperspectral cameras

Norsk Elektro Optikk (NEO) was established in 1985 as a privately owned research-oriented company within the field of electro-optics. NEO has grown to be the largest independent research and development organization in electro-optics in Norway, and has in addition established itself as a manufacturer of advanced electro-optical products for an international market.HySpex, NEO's line of hyperspectral cameras,are compact, high performance and versatile instruments for a multitude of applications. Contact: Hallvard Skjerping, CCO, hallvard@neo.no

I-Photonics #403

SPIE. CORPORATE MEMBER

Parko g. 3, Avižienių k., 14198 Lithuania
+37066890702
info@i-photonics.lt; www.i-photonics.lt

Featured Product: Vacuum coating equipment, optical components & job coating service

I-Photonics is one of the world leaders in developing of thin film technologies and designing and manufacturer of vacuum coating equipment. Having grown from the scientific lab, today company is a great team of professionals in all the areas related to the physics of surfaces, plasma, ion beams, development and production of vacuum coating machines.All I-Photonics equipment is equipped with our own Optical Monitoring System. The Coaters portfolio includes IBAD, IBS, DLC and PARMS. Contact: Mike Ivanovski, COO, m.ivanovski@i-photonics.lt; Hanna Bachyla, Marketing Specialist, h.bachyla@i-photonics.lt

Laser 2000 Benelux #202

Voorbancken 13a, Vinkeveen, 3645 GV Netherlands
+31 297 266 191
pkramer@laser2000.nl; www.laser2000.nl

Featured Product: Computerized sub-micron positioning | Tunable calibration light sources | CQD-SWIR cameras.

We are a high-tech distributor and expert partner in photonics / opto-electronics. We care as much about our academic customers as our OEM's. With our years of experience in photonics we have all technical knowledge on products and applications. We install, train and repair our products. Laser2000 Benelux likes to be challenged. So, how can we help you? Contact: Pieter Kramer, sales director, pkramer@laser2000.nl

mirSense #400

Campus Eiffel Bat E, 1 Rue Jean Rostand, Orsay, 91400 France
+33 1 73 37 73 52
contact@mirsense.com; www.mirsense.com

Featured Product: MWIR QCL delivering >1W at 4.0μm, >1.5W at 4.6μm and >750mW at 9.xμm with circular beam option

mirSense is a French privately-owned ISO9001-certified manufacturer of QCL systems. For high-power applications, we manufacture >1W QCLs as well as customized systems combining power and/or wavelengths. The QCLs can be ordered with a circular beam at chip level and packaged in a ruggedized HHL package. We also produce pulsed drivers. For spectroscopy applications, we manufacture photoacoustic OEM gas analysers with our chips inside as well as single-line DFB lasers from 4 to 20 μm wavelength. Contact: Adrien Dequaire, QCL laser sales manager, adrien.dequaire@mirsense.com; Mathieu Carras, Ceo, mathieu.carras@mirsense.com

National Institute of Environmental Research (NIER) #404

Environmental Satellite Center, Hwangyong-ro 42, Seogu, Incheon, 22689 Korea, Republic of
+82 32 560 7114; fax +82 32 568 2033
kimgoo9@korea.kr; www.nier.go.kr

Featured Product: The ESC is the ground station of the world's first geostationary air quality satellite instrument.

ESC(Environmental Satellite Center) was established in 2018 as a subdivision of NIER. ESC has operated the GEMS(Geostationary Environmental Monitoring Spectrometer) since 2020. 21 types basic products and 7 application products are being serviced through the website (https://nesc.nier.go.kr). Contact: Goo Kim, Envirional Researcher, kimgoo9@korea.kr; Jaehoon Jeong, Envirional Senior Researcher, jaehoon80@korea.kr

NEW IMAGING TECHNOLOGIES #103

SPIE. CORPORATE MEMBER

Bat D 1er Etage, 1-4 impasse de la noisette, Verrières le Buisson, 91370 France
+33 1 64 47 88 58
info@new-imaging-technologies.com; www.new-imaging-technologies.com

Featured Product: French-made in-house designed, manufactured SWIR sensors & cameras

New Imaging Technologies (NIT) is a French SME pioneer in SWIR & Wide Dynamic Range solutions in the field of sensors and camera engineering. With over 15 years of academic research and patented technologies, NIT masters all the steps from image sensor design to complete camera engineering. NIT offers a complete range of SWIR InGaAs & HDR CMOS cameras & sensors, for a variety of applications where performance, cost, quality, and reliability are of premium choice.

Nippon Electric Glass Co., Ltd. #406

7-1 Seiran 2-chome, Otsu Shiga, 520-8639 Japan
+81-77-537-1700
info@neg.co.jp; www.neg.co.jp/

Featured Product: LWIR Transmitting Glass Lens

The world's leading manufacturer of special glass.Our goal is to become the world's leading manufacturer of special glass, with the best talent, the best technology, and the best creative manufacturing ability. At the same time, we strive to run our company in a way that inspires pride among our workers and enables us to make a genuine contribution to the community. The way we see it, creative manufacturing is achieved through state-of-the-art technological development, the highest quality standard. Contact: Shunsuke Homoto, shomoto@neg.co.jp; Makoto Nishimura, mnishimura@neg.co.jp

Photon Force Ltd. #409

SPIE. CORPORATE MEMBER

Murchison House, 10 Max Born Crescent, Edinburgh, EH9 3BF United Kingdom
+44 1316517944
enquiries@photon-force.com; www.photon-force.com

Featured Product: SPAD sensors, ROICs, and Time-Resolved Single-Photon Camera Systems

Photon Force is an award-winning company on a mission to provide innovative single-photon sensitive detector technologies to accelerate industrial and research applications, in areas including remote sensing, LiDAR, quantum tech and DCS. We are the leading commercial developer of CMOS single-photon sensitive time-resolved SPAD array cameras and sensors, offering the world's highest throughput. We are also developing several next generation SPAD-based technologies and processing capabilities. Contact: Ryan Warburton, Senior Applications Engineer, ryan.warburton@photon-force.com

PowerPhotonic #110

SPIE. CORPORATE MEMBER

St David's Business Park, 5A St. David's Dr, Dalgety Bay, KY11 9PF United Kingdom
+44 1383 825910
sales@powerphotonic.com; www.powerphotonic.com

PowerPhotonic designs, manufactures & validates beam shaping and image enhancing optics for the most demanding applications in Industrial Laser Material Processing (Additive Manufacturing, Cutting, Welding & Marking); Ophthalmology and microscopy-based Imaging; Directed Energy; Laser projection displays. PowerPhotonic uses proprietary freeform processes that have been developed over 15 years, and is now an established leading manufacturer of precision, high power optical components. Contact: Stephen Kidd, Head of Sales and Marketing, steve.kidd@powerphotonic.com; Scott Barrie, Sales Manager EMEA, scott.barrie@powerphotonic.com

SANDVIK OSPREY LTD #108

Red Jacket Works, Milland Rd, Neath W Glamorgan, SA11 1NJ United Kingdom
+44 1639 634121
cealloys.osprey@sandvik.com; www.cealloys.sandvik/en

Sandvik provides lightweight, high modulus products made from controlled expansion alloys (CE alloys). Osprey CE alloy products are manufactured according to custom design in the form of, for example, thermal management products and electronic packaging modules as well as structural products for optical systems, electronics assembly and semiconductor processing equipment.

SET #504

131 Impasse Barteudet, Saint-Jeoire, 74490 France
info@set-sas.fr; https://www.set-sas.fr

Featured Product: High accuracy Flip-Chip Bonders

SET is a world leading supplier of high accuracy Flip-Chip Bonders. Since 1975, we have been designing and manufacturing semiconductor equipment dedicated to high precision applications. We accompany laboratories and industries, which look for a high precision and an important reliability in the assembly of their components. With Flip-Chip Bonders installed worldwide, SET is globally renowned for the unsurpassed sub-micron accuracy and the flexibility of its equipment.

SPECTROGON #405

SPIE. CORPORATE MEMBER

Southfields Ind Est, Whitworth Rd, Glenrothes Fife, KY6 2TF United Kingdom
+44 1592 770 000; fax +44 1592 770 040
sales.uk@spectrogon.com; www.spectrogon.com

Spectrogon is an independent manufacturer of Thin Film Optical Coatings, Filters and Holographic Diffraction Gratings. Our filters span the full range from the UV, through the visible, near infrared, and out to approximately 20 μm in the IR. Low defect coating manufacture and measurement. Custom manufacture for integration into cooled and uncooled thermal imagers – Coating on wafers up to 200 mm (8") diameter – Excellent dicing capability, down to 1x1 mm, delivery on tape available. Contact: Graeme ROBB, Genaral Manager, sales.uk@spectrogon.com

SVS-Vistek GmbH #104

Ferdinand-Porsche-Str. 3, Gilching, 82205 Germany
+49 8105 3987 60; fax +49 8105 3987 699
info@svs-vistek.com; www.svs-vistek.com

Featured Product: The FXO combines outstanding image quality with fast interfaces and other powerful camera features.

SVS-Vistek GmbH has exceptional know-how in industrial image processing as an innovative manufacturer of high-quality industrial CCD and CMOS cameras for more than 35 years. We develop and produce a wide range of cameras with the highest resolutions and highest speeds and all relevant interfaces in our own clean rooms at our headquarters in Gilching, Germany. With offices in the USA and Japan and a large partner network, we can advise, support and serve customers in many markets worldwide. Contact: Richard Grams, Channel Sales Director EMEA, r.grams@svs-vistek.com; Heiko Straaten, Fiel Application Engineer, h.straaten@svs-vistek.com

Teem Photonics #502

61 Chemin du Vieux Chêne, Meylan, 38240 France
+33 4 76 04 05 06; fax +33 4 76 04 03 02
sales-eo@teemphotonics.com; www.teemphotonics.com

Teem Photonics offers short pulse Lasers with exceptional lifetime and reliability for OEM and Laboratory applications. Emission wavelengths range from 1938 nm to 213 nm support customers for sensing, analytics, instrumentation, and materials processing.The company also offers ioNext, a fast-track PIC technology with an unmatched turn-around time of 5 weeks for quantum, sensing and com applications.

TELOPS #407

SPIE. CORPORATE MEMBER

100-2600 Saint-Jean-Baptiste Ave, Quebec, QC, G2E 6J5 Canada
+1 418 864 7808
sales@telops.com; www.telops.com

Featured Product: The Hyper-Cam Mini xLW and the Hyper-Cam Airborne Mini

Located in Quebec City, Canada, Telops designs and manufactures high-performance hyperspectral imaging systems and infrared cameras for defence, industrial, and academic research applications. Telops also offers R&D services for optical systems technology development in order to respond to the specific needs of its customers. Contact: Stephane Boubanga-Tombet, Business Development Manager, stephane.boubanga@telops.com

ThermoAnalytics #500

23440 Airpark Blvd, Calumet, MI, 49913 United States
+1 906 482 9560; fax +1 906 482 9755
sales@thermoanalytics.com; www.thermoanalytics.com

Featured Product: TAITherm™, MuSES™, CoTherm™

ThermoAnalytics is an employee-owned company with its headquarters in Michigan's scenic Upper Peninsula. ThermoAnalytics (TAI) is a global thermal, fluid-flow, and infrared modeling software developer. ThermoAnalytics software products and services help engineers in organizations worldwide to optimize product concepts early in the design process, enabling them to significantly improve product quality while reducing product development time and cost. Contact: Kameswara Kethireddy, EU Business Development Manager, kkr@thermoanalytics.com; Sacha Jelic, Key Account Manager, sj@thermoanalytics.com

SPONSOR

Videology Industrial-Grade Cameras #402

High Tech Campus 5, Eindhoven, 5656 AE Netherlands
+31 40 7200159
info-eu@videologyinc.com; www.videologyinc.com

Featured Product: SCAiLX-ZB cameras | Autofocus zoom block cameras powered with Edge AI/IP platform

Videology is a global leader in the design, engineering, and manufacturing of industrial embedded cameras and related solutions. For more than 25 years we have been providing performance excellence in a broad spectrum of applications including biomedical devices, life sciences, transportation management, aerospace, defense, and more. We are an ISO 9001-certified company headquartered in Mansfield, USA. with the Center of Engineering Excellence in Eindhoven, the Netherlands. Contact: Johan Scheepmaker, Director of Sales & Operations, Europe, jscheepmaker@videologyinc.com; Marc van den Heuvel, Regional Sales Manager, Europe, mvandenheuvel@videologyinc.com

SPIE PRODUCT DEMONSTRATIONS

MONDAY 4 SEPTEMBER	
15:30	**Caeleste** Versatile image sensors for the Space 4.0 era *Presenter:* **Jan Vermeiren** During the presentation we will give an overview of our solutions for the new space market, including our Faintstar star tracker, the ELFIS family of EO sensors and ELOIS hyperspectral detectors.

TUESDAY 5 SEPTEMBER	
10:30	**CI Systems** Remote Sensing, Missile stimulators and EO Testing Applications *Presenter:* **Eran Adler** Unique applications as Atmospheric Transmission Measurement, Missile stimulators for Missile Warning Systems testing and advance E-O Testers.
11:30	**Videology Industrial-Grade Cameras** Videology unlocks full potential of Edge AI cameras with SCAiLX *Presenter:* **Marc van den Heuvel** During this session, we will delve into how SCAiLX is revolutionizing video analytics and providing unparalleled insights for businesses and organizations, followed up by a live demonstration.
13:30	**Laser 2000 - Labsphere** Uncertainty Requirements and Calibration Demands to support the Calibration Life Cycle of Satellite Imagers *Presenter:* **Dan Scharpf** Labsphere, in conjunction with Laser 2000 will present a discussion on the latest uncertainty requirements for spectral and spatial satellite earth observation. To maintain the best uncertainty, the error propagation and the calibration plan must be considered from the earliest stages of defining the mission requirements. This "Calibration Life Cycle" requires consideration during pre-launch design, instrument design, pre-flight testing, in-flight calibration (active, passive, or vicarious), cross-calibration and validation, as well as post-mortem analysis for future missions. These phases will be addressed as they relate to the uncertainty demands and the calibration hardware required to meet these performance thresholds.
14:30	**I-Photonics** Multi-zone optical filters for Earth remote sensing *Presenter:* **Mike Ivanovski** Bandpass thin-film filters are used to provide wavelength selectivity in VIS-NIR-IR range. I-Photonics presents an overview of recently developed monolithic filters with improved spectral performance.

SPIE. CORPORATE MEMBERS

3 fotonai

3SAE Technologies, Inc.

4D Technology Corp.

A.J. Tuck Co.

Abrisa Technologies

ABTech, Inc.

Access Laser Co.

AccuCoat Inc.

Acktar Ltd.

Acqubit

Active Fiber Systems GmbH

Active Optical Systems, LLC

Addoptics BV

Adimec Electronic Imaging, Inc.

AdlOptica Optical Systems GmbH

Admesy B.V.

ADOS-tech, UAB

AdTech Ceramics Co.

AdTech Photonics, Inc.

AdValue Photonics, Inc.

Advance Reproductions Corp.

Advanced Fiber Resources (Zhuhai) Ltd.

Advanced Microoptic Systems GmbH

Advanced Research Corp.

Advanced Research Ctr.

AdvR, Inc.

AEMtec GmbH

Aerotech Ltd.

Aerotech, Inc.

AEye, Inc.

AFL

AKELA Laser Corp.

Alazar Technologies, Inc.

ALIO Industries Corp.

Allied Vision Technologies

Alluxa, Inc.

Alnair Labs Corp.

ALPAO S.A.S.

Alpine Research Optics

Altechna UAB

Altos Photonics, Inc.

American Ctr. for Optics Manufacturing, Inc.

AMETEK Electronic Packaging

AMETEK, Inc.

Amplification Technologies, Inc.

Amplitude Laser Group

Amplitude Laser Inc.

Analog Modules, Inc.

Andover Corp.

Ansys Canada Ltd.

Ansys, Inc.

AP Technologies Ltd.

Aperture Optical Sciences Inc.

Apollo Optical Systems, Inc.

Applied Image, Inc.

Applied Physics & Electronics, Inc.

Applied Surface Technologies

Apre Instruments, Inc.

April Electro-Optics Co., Ltd.

Archer OpTx, Inc.

Arizona Optical Metrology LLC

ARKA Group, L.P.

Armadillo SIA

Arroyo Instruments, LLC

ASA Astrosysteme GmbH

Asahi Spectra USA Inc.

asphericon

asphericon GmbH

attocube systems Inc.

Auxora, Inc.

Avantes B.V.

Avantes, Inc.

Avantier Inc.

Avo Photonics, Inc.

Axiom Optics

Ayase America Inc.

Ball Aerospace

Bandwidth10 Inc.

BaySpec, Inc.

Beamtech Optronics Co., Ltd.

Beijing RealLight Technology Co., Ltd.

Beijing TRANS Manufacture and Trade Co., Ltd.

Beneq Oy

Berkshire Photonics, LLC

BluGlass, Ltd.

BMV Optical Technologies Inc.

Bodkin Design & Engineering, LLC

Boston Electronics Corp.

Boston Micromachines Corp.

Boulder Nonlinear Systems

Boxin Photoelectric Co., Ltd.

Breault Research Organization, Inc.

Brewer Science, Inc.

Bristol Instruments, Inc.

Bühler Inc.

BWT Beijing Ltd.

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FresnelFactory Inc.

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INO

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I-Photonics, UAB

Iradion Laser, Inc.

IRD Glass

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Lumina Power, Inc.

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MPB Communications Inc.

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nanoplus Nanosystems and Technologies GmbH

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Nanotronics Imaging, Inc.

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NLM Photonics

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NUVIEW, Inc.

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TECHNICAL CONFERENCES SCHEDULE
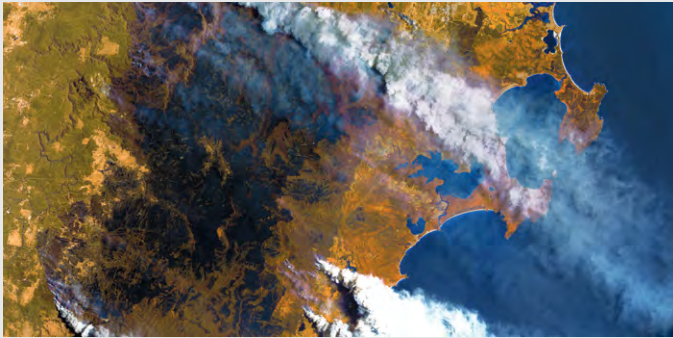
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Conference 12727

Remote Sensing for Agriculture, Ecosystems, and Hydrology XXV

3 - 6 September 2023 | E102

Conference Chairs: **Christopher M. U. Neale,** Univ. of Nebraska Lincoln (United States); **Antonino Maltese,** Univ. degli Studi di Palermo (Italy)

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SUNDAY 3 SEPTEMBER 2023

SESSION 1: MACHINE LEARNING AND DEEP LEARNING I

3 September 2023 • 13:40 - 15:00 | E102
Session Chair: Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States)

12727-1
Multisensor data fusion for automated insect monitoring (KInsecta)
Author(s): Martin Tschaikner, Felix Bießmann, Danja Brandt, Teodor Chiaburu, Henning Schmidt, Berliner Hochschule für Technik (Germany); Ilona Schrimpf, Thomas Schrimpf, Alexandra Stadel, Umweltbildungszentrum Listhof e.V. (Germany); Frank Haußer, Beuth Hochschule für Technik Berlin (Germany); Ingeborg E. Beckers, Berliner Hochschule für Technik (Germany)
3 September 2023 • 13:40 - 14:00 | E102

12727-2
ConvLSTM-based drought prediction using vegetation health index (VHI)
Author(s): Soo-Jin Lee, Geomatics Research Institute (Republic of Korea); Yangwon Lee, Pukyong National Univ. (Republic of Korea)
3 September 2023 • 14:00 - 14:20 | E102

12727-3
Comparison of deep learning-based models for forecasting precipitation using era-5 and radar images
Author(s): Hyungwoo Kim, Soo-Jin Lee, Yangwon Lee, Pukyong National Univ. (Republic of Korea)
3 September 2023 • 14:20 - 14:40 | E102

12727-50
Generating mustard crop maps using planet scope high resolution dataset by applying machine learning algorithms
Author(s): Vishal Sharma, Sanjay Kumar Ghosh, Indian Institute of Technology Roorkee (India)
3 September 2023 • 14:40 - 15:00 | E102

Coffee Break 15:00 - 15:30

SESSION 2: SURFACE, COASTAL, AND GROUND WATER

3 September 2023 • 15:30 - 17:30 | E102
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

12727-6
Remote sensing data upon application of methodology for defining the adjoining lands and flooding river stripes in Bulgaria
Author(s): Kamelia Radeva, Space Research and Technology Institute (Bulgaria); Silvia Kirilova, Univ. of Architecture, Civil Engineering and Geodesy (Bulgaria)
3 September 2023 • 15:30 - 15:50 | E102

12727-7
Evaluation of trophic state index (TSI) of the Corumbá IV Reservoir (midwest Brazil) using remote sensing and Landsat satellite images
Author(s): Daniel Beltrão, Thiago Lappicy, Rejane Cicerelli, Tati de Almeida, Univ. de Brasília (Brazil)
3 September 2023 • 15:50 - 16:10 | E102

12727-8
Remote sensing of total suspended solids (TSS) of the Paranoá Lake's (Brasília, Federal District) using Landsat satellite images
Author(s): Daniel Beltrão, Thiago Lappicy, Rejane Cicerelli, Tati de Almeida, Univ. de Brasília (Brazil)
3 September 2023 • 16:10 - 16:30 | E102

12727-9
Neyman-Pearson detection of ground water and nonwater sites using Sentinel-1 SAR data
Author(s): Songxin Tan, South Dakota State Univ. (United States)
3 September 2023 • 16:30 - 16:50 | E102

12727-10
Country-wide flood monitoring service: methods, applications and functionalities
Author(s): Edyta Wozniak, Marta Milczarek, Ewa Gromny, Marek Ruciński, Milena Cudak, Michal Krupinski, Malgorzata Jenerowicz-Sanikowska, Jakub Ryzenko, Marcin Krupinski, Space Research Ctr. of the Polish Academy of Sciences (Poland)
3 September 2023 • 16:50 - 17:10 | E102

12727-11
A radiometric contouring method to map the shoreline
Author(s): Antonino Maltese, Francesco Caldareri, Nicolò Parrino, Simona Todaro, Gino Dardanelli, Attilio Sulli, Univ. degli Studi di Palermo (Italy)
3 September 2023 • 17:10 - 17:30 | E102

MONDAY 4 SEPTEMBER 2023

SESSION 3: FOREST MAPPING AND MONITORING I

4 September 2023 • 09:10 - 10:10 | E102
Session Chair: Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States)

12727-12

Mapping forest microclimates using Sentinel 1 Radar data: insights and complementarity with LiDAR and optical data

Author(s): Marianne Laslier, Etienne Lalechere, Eva Gril, Nicolas Ferrer, Jonathan Lenoir, Univ. de Picardie Jules Verne (France)

4 September 2023 • 09:10 - 09:30 | E102

12727-13

Next-generation L-band SAR forest monitoring for highly accurate, operational deforestation early warning

Author(s): Christian N. Koyama, Japan Aerospace Exploration Agency (Japan); Masanobu Shimada, Tokyo Denki Univ. (Japan); Kazufumi Kobayashi, Tsutomu Yamanokuchi, Remote Sensing Technology Ctr. of Japan (Japan); Masato Hayashi, Takeo Tadono, Japan Aerospace Exploration Agency (Japan)

4 September 2023 • 09:30 - 09:50 | E102

12727-15

Assessing the vulnerability of Western Himalayan ecosystem to climate change using machine learning algorithms

Author(s): Aditi Ahlawat, Arijit Roy, Indian Institute of Remote Sensing (India)

4 September 2023 • 09:50 - 10:10 | E102

Coffee Break 10:10 - 10:40

SESSION 4: FOREST MAPPING AND MONITORING II

4 September 2023 • 10:40 - 12:00 | E102
Session Chair: Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States)

12727-16

The analysis of the afforestation coefficient in a watershed using the remote sensing and GIS

Author(s): Codruta Badaluta, Univ. Politehnica Timisoara (Romania)

4 September 2023 • 10:40 - 11:00 | E102

12727-17

Integrating NDVI data from different remote sensing satellite platforms to produce consistent serial forest productivity index (FPI) for Australian national carbon accounting model

Author(s): Tingbao Xu, The Australian National Univ. (Australia)

4 September 2023 • 11:00 - 11:20 | E102

12727-18

Automatic extraction of former WWI battlefields from ancient maps

Author(s): Nelly Paradelle, Marianne Laslier, Guillaume DeCocq, EDYSAN, CNRS (France)

4 September 2023 • 11:20 - 11:40 | E102

12727-19

Climatic safety margins of mixed moist deciduous forests in Eastern Indian Himalayas

Author(s): Lungyina Beulule Meru, Sanjo Jose Veliyathukudy, Forest Research Institute (India); Rajiv Pandey, Indian Council of Forestry Research and Education (India)

4 September 2023 • 11:40 - 12:00 | E102

Lunch/Exhibition Break 12:00 - 13:30

SESSION 5: AGRICULTURAL VEGETATION

4 September 2023 • 13:30 - 15:30 | E102
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

12727-20

Insights into entangled variations in the red-edge position and red to far-red ratios of soybean leaves

Author(s): Gladimir V. G. Baranoski, Univ. of Waterloo (Canada)

4 September 2023 • 13:30 - 13:50 | E102

12727-21

Unsupervised monitoring of irrigated crops in Portugal using Sentinel-2

Author(s): Pedro José Benevides, Direção-Geral do Território (Portugal); Hugo Costa, Direção-Geral do Território (Portugal), NOVA Information Management School (Portugal); Francisco D. Moreira, Direção-Geral do Território (Portugal); Mário Caetano, Direção-Geral do Território (Portugal), NOVA Information Management School (Portugal)

4 September 2023 • 13:50 - 14:10 | E102

12727-22

Potential of optical and radar satellite observations to estimate rice biophysical variables and rice yield estimation

Author(s): Jatuporn Nontasiri, Jadu Dash, Gareth Roberts, Univ. of Southampton (United Kingdom)

4 September 2023 • 14:10 - 14:30 | E102

12727-23

Towards optimising the derivation of phenological phases of different crop types over Germany using satellite image time series

Author(s): Abdelaziz Htitiou, Federal Research Ctr. for Cultivated Plants, Institute for Crop and Soil Science, Julius Kühn-Institut (Germany); Heike Gerighausen, Markus Möller, Julius Kühn-Institut (Germany)

4 September 2023 • 14:30 - 14:50 | E102

12727-24

The dynamics of rice biophysical variables in irrigated and non-irrigated systems during the growing season

Author(s): Jatuporn Nontasiri, Jadu Dash, Gareth Roberts, Univ. of Southampton (United Kingdom)

4 September 2023 • 14:50 - 15:10 | E102

12727-25

Mapping rice paddy fields in semiarid northeastern Thailand using Sentinel-1 and -2 time series data and phenological clustering

Author(s): Sitthisak Moukomla, Siam Lawawirojwong, Kampanat Deeudomchan, Kridsakron Auynirundronkool, Teansiri Moolchan, Yatikarn Chaweewong, Thitawadee Suvachananonda, Geo-Informatics and Space Technology Development Agency (Thailand)

4 September 2023 • 15:10 - 15:30 | E102

Coffee Break 15:30 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction
16:00 to 16:10 hrs

12738-500
A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*
Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)
4 September 2023 • 16:10 - 16:55 | Forum

12742-600
Meaningful control of intelligent systems *(Plenary Presentation)*
Author(s): Peter Werkhoven, TNO (Netherlands)
4 September 2023 • 16:55 - 17:40 | Forum

12729-700
The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*
Author(s): Nicolaus Hanowski, ESRIN (Italy)
4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

SESSION 6: MACHINE LEARNING AND DEEP LEARNING II

5 September 2023 • 10:50 - 11:50 | E102
Session Chair: Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States)

12727-26
Improving wheat yield estimating by using satellite data and machine learning algorithm in Morocco
Author(s): Adra Idrissi, Samir Nadem, Univ. Sultan Moulay Slimane (Morocco); Nabila Hamdoun, Univ. Internationale de Rabat (Morocco); Abdelghani Boudhar, Univ. Sultan Moulay Slimane (Morocco); Tarik Benabdelouahab, National Research Institute (Morocco)
5 September 2023 • 10:50 - 1!:10 | E102

12727-27
Feasibility analysis of the use of Sentinel-2 images to phenologically differentiate the areas of soybean seed and sub-irrigated bean planting in the period of sanitary emptiness in the tropical floodplains of the Formoso river basin, Tocantins, Brazil
Author(s): Bruno . Machado Carneiro, Univ. de Brasíli (Brazil); Osmar Abílio Carvalho Júnior, Renato Fontes Guimarães, Univ. de Brasília (Brazil); Balbino Evangelista, EMBRAPA-CNPASA (Brazil); Aline Marcimiano Lima, Univ. de Brasília (Brazil); Dora Silva Antony, UnB - Departamento de Geografia - LSIE (Brazil)
5 September 2023 • 11:10 - 11:30 | E102

12727-28
Texture descriptors and machine learning algorithms for mistletoe detection in urban forests using multispectral imagery
Author(s): Paola Andrea Mejia Zuluaga, León Felipe Dozal García, Juan Carlos Valdiviezo Navarro, Ctr. de Investigación en Ciencias de Información Geoespacial (Mexico)
5 September 2023 • 11:30 - 11:50 | E102

SESSION 7: WILDFIRE MONITORING

5 September 2023 • 11:50 - 12:30 | E102
Session Chair: Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States)

12727-30
Evaluation of orbit results on wildfire detection using a broad single-channel microbolometer sensor sensitive in the thermal infrared
Author(s): Julian Bartholomäus, Philipp Werner, Enrico Stoll, Technische Univ. Berlin (Germany)
5 September 2023 • 11:50 - 12:10 | E102

12727-33
A comparison of Sentinel-2 and Landsat data for monitoring forest fires and landcover changes in Blida Province, Algeria
Author(s): Riad Guehaz, Ctr. de Développement des Téchnologies Avancées (Algeria)
5 September 2023 • 12:10 - 12:30 | E102

Lunch/Exhibition Break 12:30 - 13:50

SESSION 8: HYPERSPECTRAL, HIGH SPATIAL RESOLUTION

5 September 2023 • 14:00 - 14:40 | E102
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

12727-35
Adequacy of Mediterranean forest simulations from DART radiative transfer model and UAV laser scanning data to hyperspectral images
Author(s): Marianne Debue, Ctr. d'Etudes Spatiales de la Biosphère, CNES, CNRS, IRD, Univ. Paul Sabatier (France); Grégoire Vincent, AMAP, CNRS, CIRAD, INRAE, IRD, Univ. de Montpellier (France); Samuel Alleaume, Florian de Boissieu, TETIS, AgroParisTech, CIRAD, INRAE, CNRS, Univ. de Montpellier (France); Xavier Briottet, ONERA, DOTA, Univ. de Toulouse (France); Jean-Baptiste Féret, TETIS, INRAE, AgroParisTech, CIRAD, CNRS, Univ. de Montpellier (France); Jean-Philippe Gastellu-Etchegorry, Ctr. d'Etudes Spatiales de la Biosphère (France); Jean-Marc Limousin, Damien Longepierre, Ctr. d'Ecologie Fonctionnelle et Evolutive, CNRS, EPHE, IRD, Univ. de Montpellier (France); Karine Adeline, ONERA, DOTA, Univ. de Toulouse (France)
5 September 2023 • 14:00 - 14:20 | E102

12727-38
Foliar spectral responses of sugarcane and maize: how comparable are they?
Author(s): Gladimir V. G. Baranoski, Univ. of Waterloo (Canada)
5 September 2023 • 14:20 - 14:40 | E102

SESSION 9: ENERGY BALANCE, EVAPOTRANSPIRATION

5 September 2023 • 14:40 - 16:50 | E102
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

12727-39
Association of catchment characteristics to Budyko hydrologic model's uncertainty in humid catchments
Author(s): Lilin Zhang, Michael Marshall, Anton Vrieling, Andy Nelson, Univ. Twente (Netherlands)
5 September 2023 • 14:40 - 15:00 | E102

12727-41

Regional daily evapotranspiration estimation using remote sensing data and atmospheric land exchange inverse energy model in Brazil

Author(s): Sami Akasheh, Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States); Martha Anderson, USDA (United States); Christopher Hain, NASA (United States); Débora R. Roberti, Univ. Técnica Federico Santa María (Brazil); Ivo Zution, Daugherty Water for Food Global Institute (United States); Mitchell Schull, Univ. of Maryland, College Park (United States)

5 September 2023 • 15:00 - 15:20 | E102

Coffee Break 15:20 - 15:50

12727-42

The feasibility of combining the two-source energy balance (TSEB) model with object-based approaches to estimate surface heat fluxes

Author(s): HuiYuan Liu, Xin XiaoZhou, Aerospace Information Research Institute (China)

5 September 2023 • 15:50 - 16:10 | E102

12727-43

Remote sensing-based evapotranspiration modeling for several land uses using the SETMI model for Nebraska

Author(s): Ivo Zution Goncalves, Christopher M. U. Neale, Sami Akasheh, Burdette Barker, Daugherty Water for Food Global Institute (United States)

5 September 2023 • 16:10 - 16:30 | E102

12727-44

Evaluation of the SEBAL and SAFER models in the estimation of the actual evapotranspiration and crop coefficients of sugarcane in Colombia

Author(s): Alberto Arroyo, CENICAÑA (Colombia); Julian D. Ome Naervaez, Cenicaña (Colombia)

5 September 2023 • 16:30 - 16:50 | E102

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12727-51

Estimation of leaf chlorophyll content using UAV-based vegetation indices and GBDT model

Author(s): Yechen Xiang, Junping Zhang, Institute of Image and Information Technology, Harbin Institute of Technology (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-61

Infrared imaging for proximal and remote detection of soil-borne diseases on wild rocket

Author(s): Massimo Rippa, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy); Andrea Pasqualini, Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (Italy); Pasquale Mormile, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy); Catello Pane, Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (Italy)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-62

Using Sentinel-1 data for soybean harvest detection in Vojvodina province, Serbia

Author(s): Miljana Marković, Branislav Živaljević, Gordan Mimić, BioSense Institute, Univ. of Novi Sad (Serbia); Sean Woznicki, Robert B. Annis Water Resources Institute, Grand Valley State Univ. (United States); Oskar Marko, Predrag Lugonja, BioSense Institute, Univ. of Novi Sad (Serbia)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-63

Assessment of elevation and slope exposure impact on snow cover distribution in the mountainous region in Bulgaria using Sentinel-2 satellite data

Author(s): Daniela Avetisyan, Andrey Stoyanov, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-64

Application of optical data from Sentinel-2-MSI for snow cover monitoring on the territory of the mountainous region of Bulgaria

Author(s): Andrey Stoyanov, Daniela Avetisyan, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-65

Satellite and drone multispectral and thermal images data fusion for intelligent agriculture monitoring and decision making support

Author(s): Miroslav Y. Tsvetkov, Nikola Vaptsarov Naval Academy (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-66

Drone multispectral and thermal images data processing for intelligent agriculture support

Author(s): Miroslav Y. Tsvetkov, Nikola Vaptsarov Naval Academy (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-68

Coupling multiscale remote and proximal sensors for the estimation of crop water requirements

Author(s): Emmanouil Psomiadis, Stavros Alexandris, Agricultural Univ. of Athens (Greece); Nikolaos Proutsos, Institute of Mediterranean Forest Ecosystems, Hellenic Agricultural Organization "DEMETER" (Greece); Ioannis Charalampopoulos, Agricultural Univ. of Athens (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-72

Design and development of an innovative online modular device for both water and wastewater monitoring

Author(s): Chen-Hua Chu, Yu-Xuan Lin, Chun-Kuo Liu, Industrial Technology Research Institute (Taiwan)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-73

Prospects for using ETR lightning sensors network for the forest fires detection

Author(s): Anton S. Boldyreff, Southern Federal Univ. (Russian Federation); Aida A. Adzhieva, Kabardino-Balkarian State Agrarian Univ. (Russian Federation); Vitaliy A. Shapovalov, High Mountain Geophysical Institute (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-74

Monitoring and spatial-temporal analysis of Stryama river flood event, Karlovo municipality, Bulgaria, occurred on 02.09.2022 by the methods of remote sensing

Author(s): Andrey Stoyanov, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-75

An approach for phenotyping in wheat breeding using drone remote sensing data

Author(s): Miroslav Y. Tsvetkov, Nikola Vaptsarov Naval Academy (Bulgaria); Gallina Mihova, The Agricultural Academy, Dobrudzha Agricultural Institute (Bulgaria); Violeta Bozhanova, The Agricultural Academy, Field Crops Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12727-76

Development of drone acquisition imagery and AI-based field crop status and growth prediction model

Author(s): Jong-Hwa Park, Seung-Hwan Go, Chungbuk National Univ. (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

WEDNESDAY 6 SEPTEMBER 2023

SESSION 10: MACHINE LEARNING AND DEEP LEARNING III

6 September 2023 • 09:30 - 10:10 | E102
Session Chair: Christopher M. U. Neale, Daugherty Water for Food Global Institute (United States)

12727-47

Deep-learning-based image super-resolution for enhanced root hair visualization and root traits analysis

Author(s): Divya Mishra, Sharon Chemweno, Ofer Hadar, Naftali Lazarovitch, Jonathan E. Ephrath, Ben-Gurion Univ. of the Negev (Israel)

6 September 2023 • 09:0 - 09:30 | E102

12727-48

Plant functional type classification for the Great Himalayan National Park using machine learning algorithm

Author(s): Sanjo Jose Veliyathukudy, Forest Research Institute (India); Aditi Ahlawat, Arijit Roy, Indian Institute of Remote Sensing (India); Tara Chand, Forest Research Institute (India); Rajiv Pandey, Indian Council of Forestry Research and Education (India)

6 September 2023 • 09:30 - 9:50 | E102

12727-49

Deep learning-based coffee production detection in Paraná, Brazil: a Sentinel-1 time series and semantic segmentation approach

Author(s): Osmar Carvalho, Osmar Abilio Carvalho Júnior, Anesmar Albuquerque, Argelica Saiaka, Univ. de Brasília (Brazil)

6 September 2023 • 9:50 - 10:10 | E102

Coffee Break 10:10 - 10:40

SESSION 11: UAV, LIDAR, AND SMART SOLUTIONS FOR FARMING

6 September 2023 • 11:40 - 12:00 | E102
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

12727-52

Grassland vegetation parameters estimation using UAV hyperspectral data

Author(s): Xiaohua Zhu, Lingling Ma, Guangzhou Ouyang, Aerospace Information Research Institute (China)

6 September 2023 • 10:40 - 11:00 | E102

12727-53

Evaluation of the performance and accuracy of a micrometeorological weather station for measuring weather parameters through point measurements

Author(s): Thomas Kociok, Lars Ullmer, Eisele Christian, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Alexander M.J. van Eijk, TNO (Netherlands); Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

6 September 2023 • 11:00 - 11:20 | E102

12727-54

Evaluation of the performance of DIAL system for the determination of ethylene concentration in an agricultural area

Author(s): Novella Rutigliano, Luca Martelluci, Alessandro Puleio, Pasquale Gaudio, Univ. degli Studi di Roma "Tor Vergata" (Italy)

6 September 2023 • 11:20 - 11:40 | E102

12727-55

A technological platform for Apulian crop monitoring

Author(s): Roberto Cilli, Univ. degli Studi di Bari Aldo Moro (Italy); Giacinto Donvito, Marica Antonacci, Leonardo Cristella, Gioacchino Vino, Istituto Nazionale di Fisica Nucleare (Italy); Gaetano Alessandro Vivaldi, Vincenzo Giannico, Univ. degli Studi di Bari Aldo Moro (Italy); Vincenzo D'Avino, Distretto Tecnologico Aerospaziale S.C.a.r.l. (Italy); Manuela Matarrese, Distretto Tecnologico Aerospaziale S.C.a.r.l. (Italy); Nicola Amoroso, Roberto Bellotti, Univ. degli Studi di Bari Aldo Moro (Italy)

6 September 2023 • 11:40 - 12:00 | E102

Lunch Break 12:00 - 13:20

SESSION 12: ENVIRONMENTAL REMOTE SENSING

6 September 2023 • 13:20 - 15:00 | E102
Session Chair: Antonino Maltese, Univ. degli Studi di Palermo (Italy)

12727-56

Integrating Earth observation science into environmental impact assessment

Author(s): Darren T. Janzen, Natural Resources Canada (Canada)

6 September 2023 • 13:20 - 13:40 | E102

12727-57

Joint estimation of LSA SAF vegetation parameters with multitask Gaussian processes

Author(s): Manuel Campos-Taberner, Adrián Jiménez-Guisado, Francisco Javier García-Haro, Beatriz Martínez, Sergio Sánchez-Ruiz, María Amparo Gilabert, Univ. de València (Spain)

6 September 2023 • 13:40 - 14:00 | E102

12727-58

Lychee tree health monitoring and anomaly detection using multispectral satellite imagery in Tezpur, Assam

Author(s): Sanjit Maitra, Rituraj Gogoi, Indian Statistical Institute (India)

6 September 2023 • 14:00 - 14:20 | E102

12727-59

Application of remote sensing for monitoring restoration measures in habitats under Natura 2000: a case study for Bulgaria

Author(s): Kamelia Radeva, Space Research and Technology Institute (Bulgaria); Silvia Kirilova, Univ. of Architecture, Civil Engineering and Geodesy (Bulgaria)

6 September 2023 • 14:20 - 14:40 | E102

12727-60

Application of GIS and remote sensing for solid waste management

Author(s): Muhammad Iqbal, Univ. of Peshawar (Pakistan)

6 September 2023 • 14:40 - 15:00 | E102

Conference 12728

Remote Sensing of the Ocean, Sea Ice, Coastal Waters, and Large Water Regions 2023

4 September 2023 | D204

Conference Chairs: **Charles R. Bostater,** Florida Institute of Technology (United States); **Xavier Neyt,** Royal Military Academy (Belgium)

Programme Committee: **Samir Ahmed,** The City College of New York (United States); **Jean-Paul Bruyant,** ONERA (France); **Alexander Gilerson,** The City College of New York (United States); **Carlton R. Hall,** NASA Kennedy Space Ctr. (United States); **Frederic Lamy,** ONERA (France); **Ana M. Martins,** Univ. dos Açores (Portugal); **Stelios P. Mertikas,** Technical Univ. of Crete (Greece); **Petri Pellikka,** Univ. of Helsinki (Finland); **Miguel Velez-Reyes,** The Univ. of Texas at El Paso (United States); **Françoise Viallefont-Robinet,** ONERA (France)

MONDAY 4 SEPTEMBER 2023

SESSION 1: SENTINEL-RELATED SATELLITE SCIENCE

4 September 2023 • 08:50 - 10:00 | D204
Session Chair: Ana I. Dogliotti, Univ. de Buenos Aires (Argentina)

12728-1

Validation of Sentinel-2/MSI water reflectance and water quality products in the turbid waters of Río de la Plata estuary using fixed automated hyperspectral in situ observations *(Invited Paper)*

Author(s): Ana I. Dogliotti, Instituto de Astronomía y Física del Espacio, Univ. de Buenos Aires (Argentina); Inés O'Farrel, Instituto de Ecología Genética y Evolución, Univ. de Buenos Aires (Argentina); Lilen Yema, Univ. de Buenos Aires (Argentina); Estefanía Piegari, Instituto de Investigación e Ingeniería Ambiental, Univ. Nacional De San Martín (Argentina); Lucas Rubinstein, Pablo Perna, Instituto de Astronomía y Física del Espacio, Univ. de Buenos Aires (Argentina)

4 September 2023 • 08:50 - 09:20 | D204

12728-2

Improving operational ocean color coverage with a merged atmospheric correction approach

Author(s): Dimitry Van der Zande, Quinten Vanhellemont, Institut Royal des Sciences Naturelles de Belgique (Belgium); Kerstin Stelzer, Carole Lebreton, Brockmann Consult GmbH (Germany); Antoine Dille, Institut Royal des Sciences Naturelles de Belgique (Belgium); Joao F. Cardoso dos Santos, INPE (Brazil); Martin Böttcher, Brockmann Consult GmbH (Germany); Kevin Ruddick, Institut Royal des Sciences Naturelles de Belgique (Belgium); Carsten Brockmann, Brockmann Consult GmbH (Germany)

4 September 2023 • 09:20 - 09:40 | D204

12728-4

Turbid water sun glint removal for high-resolution sensors without SWIR

Author(s): Heloise Lavigne, Quinten Vanhellemont, Kevin Ruddick, Institut Royal des Sciences Naturelles de Belgique (Belgium)

4 September 2023 • 09:40 - 10:00 | D204

Coffee Break 10:00 - 10:30

SESSION 2: UPPER WATER-COLUMN SENSING

4 September 2023 • 10:30 - 12:20 | D204
Session Chair: Toshihiro Somekawa, Institute for Laser Technology (Japan)

12728-5

Development of a flash lidar system for remote detection of oil in water *(Invited Paper)*

Author(s): Toshihiro Somekawa, Shinri Kurahashi, Institute for Laser Technology (Japan); Akifumi Yogo, Institute of Laser Engineering, Osaka Univ. (Japan); Hiroaki Kuze, Ctr. for Environmental Remote Sensing, Chiba Univ. (Japan)

4 September 2023 • 10:30 - 11:00 | D204

12728-6

Preliminary exploration of underwater applications of hyperspectral lidar

Author(s): Huijing Zhang, Mei Zhou, Linsheng Chen, Haohao Wu, Zhou Yang, Jian Hu, Jiuying Chen, Guangzhou Ouyang, Geer Teng, Aerospace Information Research Institute (China)

4 September 2023 • 11:00 - 11:20 | D204

12728-7

CO_2 Raman lidar design for marine drone

Author(s): Tatsuo Shiina, Chiba Univ. (Japan); Ken-ich Suzuki, Koichi Tezuka, Trimatiz Ltd. (Japan)

4 September 2023 • 11:20 - 11:40 | D204

12728-9

Tracking shifting estuaries with remote sensing techniques to aid lifeboat rescue services

Author(s): Belén López Pardo, The Univ. of Manchester (United Kingdom); Ruaridh Clark, Univ. of Strathclyde (United Kingdom); Gwilym Gibbons, Creative Help, Ltd. (United Kingdom); Malcolm Macdonald, Univ. of Strathclyde (United Kingdom); Ciara N. McGrath, The Univ. of Manchester (United Kingdom)

4 September 2023 • 12:00 - 12:20 | D204

Lunch/Exhibition Break 12:20 - 13:30

SESSION 3: WATER SYSTEMS ANALYSIS SENSING

4 September 2023 • 13:30 - 15:50 | D204

Session Chair: Panagiotis Mitsopoulos,
Univ. of Connecticut (United States)

12728-10

The PAL-Spotter real-time transmitter system

Author(s): Panagiotis Mitsopoulos, Malaquias Pena, Univ. of Connecticut (United States)

4 September 2023 • 13:30 - 13:50 | D204

12728-11

Is it possible to use second derivative of water reflectance to detect phytoplankton pigments in the spectral vicinity of atmospheric absorption bands?

Author(s): Kevin Ruddick, Institut Royal des Sciences Naturelles de Belgique (Belgium)

4 September 2023 • 13:50 - 14:10 | D204

12728-12

Architecture of a sensor network for marine environments to monitor water quality

Author(s): Abigail Elizabeth Pallares-Calvo, Blanca Esther Carvajal-Gamez, Oscar Octavio Gutiérrez-Frías, Instituto Politécnico Nacional (Mexico)

4 September 2023 • 14:10 - 14:30 | D204

12728-13

Radiative transfer model for quality control of above-water hyperspectral downwelling irradiance measurements

Author(s): Masoud Moradi, Iranian National Institute of Oceanography and Atmospheric Science (Iran, Islamic Republic of); Behnaz Arabi, Univ. Bayreuth (Germany); Annelies Hommersom, Water Insight (Netherlands); Johan Van Der Molen, Royal Netherlands Institute for Sea Research (Netherlands); Cyrus Samimi, Univ. Bayreuth (Germany)

4 September 2023 • 14:30 - 14:50 | D204

12728-14

Prelaunch simulation calculation for the sun glint area of the light-weighted multispectral camera for the marine science mission and calibration mode

Author(s): Chao Wang, Aerospace Dongfanghong Satellite Co., Ltd. (China), Space Engineering Univ. (China); Shanghua Li, Keli Zhang, Jun Zhu, Lili Wang, Aerospace Dongfanghong Satellite Co., Ltd. (China)

4 September 2023 • 14:50 - 15:10 | D204

12728-15

Parameterization of phytoplankton absorption in coastal waters around China

Author(s): Tongji Lee, Jianhua Zhu, Bing Han, Hongli Zhou, Weiwei Li, National Ocean Technology Ctr. (China); Huping Ye, Institute of Geographic Sciences and Natural Resources Research (China); Xiaoqi Huang, He Wang, National Ocean Technology Ctr. (China)

4 September 2023 • 15:10 - 15:30 | D204

12728-16

Space coast Florida turbid shallow waters: Monte-Carlo modeling to support satellite algorithm development for WorldView-3 imagery

Author(s): Charles R. Bostater, Florida Institute of Technology (United States)

4 September 2023 • 15:30 - 15:50 | D204

Coffee Break 15:50 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

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12728-8

Monitoring coral reefs in Kenyan marine protected areas using remote sensing observations

Author(s): Diana Mutiso, Behnaz Arabi, Univ. Bayreuth (Germany); Jelvas Mwaura, Kenya Marine and Fisheries Research Institute (Kenya)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-17

Can WRF capture cyclone GONU and Shaheen equally well?

Author(s): Pubali Mukherjee, Indian Institute Of Technology Bombay (India); Balaji Ramakrishnan, Indian Institute of Technology Bombay (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-18

Ocean wind speeds derived from Sentinel-1A/B wave mode SAR imagery captured under different geophysical conditions

Author(s): He Wang, Weiwei Li, Xiaoqi Huang, National Ocean Technology Ctr. (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-19

Retrieving sea surface temperature from HY-2B scanning microwave radiometer based on extreme gradient boosting regression

Author(s): Xiaoqi Huang, Jianhua Zhu, He Wang, Weiwei Li, National Ocean Technology Ctr. (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-20

Utilization of blended chlorophyll-a based on geostationary and near-polar orbiting ocean color satellite data: a case study of red tide occurred in the East Sea in 2013

Author(s): Hye-kyeong Shin, Jae-yeop Kwon, Da-hui Kim, Tae-ho Kim, UST 21 Co., Ltd. (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-21

Monitoring coastal erosion in Cyprus: an analysis utilizing Sentinel-1 SAR data

Author(s): George Melillos, Eleftheria Kalogirou, ERATOSTHENES Ctr. of Excellence, Cyprus Univ. of Technology (Cyprus); Diofantos Hadjimitsis, ERATOSTHENES Ctr. of Excellence (Cyprus)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-22

Maritime surveillance in Cyprus using Sentinel-1 SAR

Author(s): Eleftheria Kalogirou, George Melillos, ERATOSTHENES Ctr. of Excellence, Cyprus Univ. of Technology (Cyprus); Diofantos Hadjimitsis, ERATOSTHENES Ctr. of Excellence (Cyprus)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-23

Coastal water feature extraction using WorldView-3 imagery in shallow estuarine water

Author(s): Charles R. Bostater, Florida Institute of Technology (United States)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-24

High-precision retrieval of CDOM and its spatiotemporal characteristics in the northwest coast of the South China Sea

Author(s): Dongyang Fu, Shiyun Wei, Guo Yu, Yan Wang, Guangdong Ocean Univ. (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-25

Polar Digital Space in Antarctica

Author(s): Temenuzhka Spasova, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-26

UAV for base map concession of seaweed aquaculture area in Sulawesi, Indonesia

Author(s): Nurjannah Nurdin, Sri Suro Adhawati, Hasanuddin Univ. (Indonesia); Ihsan Basir, Regional Planning Agency (Indonesia); Rustam Rustam, Hasanuddin Univ. (Indonesia); Muhammad Haris Susanto, Kamrin Jama, Regional Planning Agency (Indonesia); Muhammad Akbar AS, Research and Development Ctr. for Marine, Coast and Small Islands, Hasanuddin Univ. (Indonesia); Farida Patittingi, Hasanuddin Univ. (Indonesia)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-27

Nonpolarized microwave backscattering and decimeter-scale wind waves

Author(s): Irina A. Sergievskaya, Stanislav Ermakov, Leonid Plotnikov, Ivan Kapustin, Institute of Applied Physics of the RAS (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-28

Conv-LSTM-based forecasting of night-fishing fleets using VIIRS DNB

Author(s): Euihyun Kim, Joo-Hyung Ryu, Korea Institute of Ocean Science & Technology (Republic of Korea), Univ. of Science and Technology (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-29

Mapping concentrations of water quality parameters using time series of multispectral satellite images over complex shallow waters of the Wadden Sea supported by Radiative Transfer Modeling

Author(s): Behnaz Arabi, Univ. Bayreuth (Germany); Masoud Moradi, Iranian National Institute of Oceanography and Atmospheric Science (Iran, Islamic Republic of); Cyrus Samimi, Univ. Bayreuth (Germany); Wouter Verhoef, Univ. Twente (Netherlands)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-30

Sea surface plastic waste monitoring using thermal and multispectral aerial drone sensors data processing

Author(s): Miroslav Y. Tsvetkov, Nikola Vaptsarov Naval Academy (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12728-31

Port aquatories, coastal zone and sea bottom plastic waste monitoring using underwater drones data processing

Author(s): Miroslav Y. Tsvetkov, Nikola Vaptsarov Naval Academy (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12729

Sensors, Systems, and Next-Generation Satellites XXVII

3 - 6 September 2023 | E104

Conference Chairs: **Sachidananda R. Babu,** NASA Earth Science Technology Office (United States); **Arnaud Hélière,** European Space Research and Technology Ctr. (Netherlands); **Toshiyoshi Kimura,** Japan Aerospace Exploration Agency (Japan)

Programme Committee: **Philippe Martimort,** European Space Research and Technology Ctr. (Netherlands); **Josep Rosello,** European Space Research and Technology Ctr. (Netherlands); **Xiaoxiong J. Xiong,** NASA Goddard Space Flight Ctr. (United States)

SUNDAY 3 SEPTEMBER 2023

SESSION 1: US MISSIONS AND TECHNOLOGY I

3 September 2023 • 13:00 - 15:00 | E104
Session Chair: Sachidananda R. Babu, NASA Earth Science Technology Office (United States)

12729-1
NASA missions overview (Invited Paper)
Author(s): Sachidananda R. Babu, NASA Earth Science Technology Office (United States)
3 September 2023 • 13:00 - 13:30 | E104

12729-2
Advances in small-satellite systems for high-resolution atmospheric sensing: TROPICS and CREWSR (Invited Paper)
Author(s): William J. Blackwell, MIT Lincoln Lab. (United States)
3 September 2023 • 13:30 - 14:00 | E104

12729-3
Hyperspectral Earth imaging in the LWIR and SWIR with the ACMES mission (Invited Paper)
Author(s): Charles Swenson, Bruno Mattos, Utah State Univ. (United States); Lucas S. Anderson, Chad Fish, Orion Space Solutions (United States); Robert Wright, Hawai'i Institute of Geophysics and Planetology, Univ. of Hawai'i at Manoa (United States); Mark Schoeberl, Science and Technology Corp. (United States)
3 September 2023 • 14:00 - 14:20 | E104

12729-4
The HyTI Mission
Author(s): Robert Wright, Hawai'i Institute of Geophysics and Planetology (United States); Miguel Nunes, Hawai'i Space Flight Lab., Univ. of Hawai'i at Manoa (United States); Paul Lucey, Hawai'i Institute of Geophysics and Planetology (United States); Sarath Gunapala, Jet Propulsion Lab., California Institute of Technology (United States); Sir Rafol, David Ting, Jet Propulsion Lab. (United States); Chiara Ferrari-Wong, Luke Flynn, Hawai'i Institute of Geophysics and Planetology (United States); Tom George, SaraniaSat Inc. (United States)
3 September 2023 • 14:20 - 14:40 | E104

12729-5
Integrated active thermal control for hyperspectral LWIR imaging on advanced high-powered CubeSat platforms
Author(s): Lucas S. Anderson, Orion Space Solutions (United States), Utah State Univ. (United States); Charles Swenson, Utah State Univ. (United States); Chad Fish, Orion Space Solutions (United States); Rob Wright, Hawai'i Institute of Geophysics and Planetology (United States); Miguel Nunes, Hawaii Space Flight Lab., Univ. of Hawai'i at Manoa (United States)
3 September 2023 • 14:40 - 15:00 | E104

Coffee Break 15:00 - 15:30

SESSION 2: EUROPEAN MISSIONS AND TECHNOLOGY I

3 September 2023 • 15:30 - 17:20 | E104
Session Chair: Arnaud Hélière, European Space Agency (Netherlands)

12729-6
ESA missions overview (Invited Paper)
Author(s): Arnaud Hélière, European Space Agency (Netherlands)
3 September 2023 • 15:30 - 16:00 | E104

12729-7
The Copernicus Hyperspectral Imaging Mission for the Environment (CHIME): an overview of its mission, system and planning status
Author(s): Jens Nieke, Heidrun Weber, Helene Strese, Antonio Gabriele, European Space Research and Technology Ctr. (Netherlands); Ferran Gascon, Valentina Boccia, European Space Agency—ESRIN (Italy); Marco Celesti, HE Space Operations GmbH (Netherlands)
3 September 2023 • 16:00 - 16:20 | E104

12729-8
The Copernicus land surface temperature monitoring (LSTM) mission: design, technology and status
Author(s): François Bernard, Ilias Manolis, Ana Bolea Alamañac, Itziar Barat, Miguel Such Taboada, Tiziana Cardone, David Steenari, Paula Prado Montes, Piotr Skrzypek, Sebastian Weixler, Alessandra Ciapponi, Pascal Hallibert, Arvid Hammar, David Merodio Codinachs, Pilar Mingorance, Sandro Patti, Adrian Garcia, Pierre Henriot, European Space Agency (Netherlands)
3 September 2023 • 16:20 - 16:40 | E104

12729-9
Quantum sensing for earth observation at the European Space Agency: latest developments, challenges, and future prospects
Author(s): Aaron Strangfeld, Olivier Carraz, Anna Eiden, Arnaud Heliere, Pierluigi Silvestrin, European Space Agency (Netherlands)
3 September 2023 • 16:40 - 17:00 | E104

12729-10
ALTIUS atmospheric limb sounding mission, a novel hyperspectral imager
Author(s): Nicolas Saillen, European Space Agency (Netherlands); Ludovic Aballea, OIP N.V. (Belgium); Guillaume Petitjean, David Buhler, European Space Agency (Netherlands); Dominique Mollet, Marc Creemers, OIP N.V. (Belgium); Joris Naudet, Arnaud Femelear, Redwire Space N.V. (Belgium); Luciana Montrone, Daniel Navarro-Reyes, Michael François, European Space Agency (Netherlands); Chabley Pollier, Redwire Space N.V. (Belgium)
3 September 2023 • 17:00 - 17:20 | E104

MONDAY 4 SEPTEMBER 2023

SESSION 3: JAPANESE MISSIONS AND TECHNOLOGY I

4 September 2023 • 08:30 - 10:00 | E104
Session Chair: Toshiyoshi Kimura,
Japan Aerospace Exploration Agency (Japan)

12729-12

Overview of Japanese Earth Observation programs
(Invited Paper)

Author(s): Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

4 September 2023 • 08:30 - 09:00 | E104

12729-13

Overview and current status of GOSAT-GW mission and AMSR3 instrument

Author(s): Takeshi Miura, Kazuya Inaoka, Misako Kachi, Yasushi Kojima, Japan Aerospace Exploration Agency (Japan)

4 September 2023 • 09:00 - 09:20 | E104

12729-14

Global and regional CO_2 and CH4 flux distributions derived from the inversion analyses of GOSAT series data and their temporal variations

Author(s): Tsuneo Matsunaga, Makoto Saito, Tazu Saeki, Hiroshi Takagi, Kazutaka Murakami, Shamil Maksyutov, Yosuke Niwa, Hiroshi Tanimoto, Hisashi Yashiro, Yosuke Yamashita, National Institute for Environmental Studies (Japan)

4 September 2023 • 09:20 - 09:40 | E104

12729-15

The current status of ALOS-4

Author(s): Satoko H. Miura, Yuki Etoh, Yukihiro Kankaku, Takeshi Motohka, Kazuhide Yamamoto, Yoshihisa Arikawa, Japan Aerospace Exploration Agency (Japan)

4 September 2023 • 09:40 - 10:00 | E104

Coffee Break 10:00 - 10:30

SESSION 4: JAPANESE MISSIONS AND TECHNOLOGY II

4 September 2023 • 10:30 - 11:50 | E104
Session Chair: Toshiyoshi Kimura,
Japan Aerospace Exploration Agency (Japan)

12729-16

From ALOS-2 to ALOS-4: Japan's pioneering L-band SARs for global vegetation monitoring: state-of-the-art and future perspectives

Author(s): Christian N. Koyama, Japan Aerospace Exploration Agency (Japan); Masanobu Shimada, Tokyo Denki Univ. (Japan); Masato Ohki, Takeo Tadono, Japan Aerospace Exploration Agency (Japan)

4 September 2023 • 10:30 - 10:50 | E104

12729-17

Conceptual study of the next-generation compact infrared camera

Author(s): Masahiro Suganuma, Seichi Sato, Makoto Hirose, Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

4 September 2023 • 10:50 - 11:10 | E104

12729-18

Feasibility study of Green Food System Support Satellite (GreFSat)

Author(s): Takahiro Kawashima, Akira Iwasaki, Shinichi Nakasuka, Yoshio Inoue, Naoto Yokoya, The Univ. of Tokyo (Japan); Toshiyoshi Kimura, Takuki Sano, Seichi Sato, Atsushi Noda, Japan Aerospace Exploration Agency (Japan); Hidenori Takahashi, Minoru Kurose, Hiroyuki Iwazaki, Kazutsugu Ogata, ATA Corp. (Japan); Seizo Suzuki, Tomei Giken Co., Ltd. (Japan)

4 September 2023 • 11:10 - 11:30 | E104

12729-19

Data downlink prioritization using image classification on-board a 6U CubeSat

Author(s): Keenan Chatar, Ezra Felding, Kei Sano, Kentaro Kitamura, Kyushu Institute of Technology (Japan)

4 September 2023 • 11:30 - 11:50 | E104

Lunch/Exhibition Break 11:50 - 13:00

SESSION 5: US MISSIONS AND TECHNOLOGY II

4 September 2023 • 13:00 - 15:30 | E104
Session Chair: Sachidananda R. Babu, NASA Earth Science Technology Office (United States)

12729-21

The joint NASA/JPL-ASI Surface Biology and Geology Thermal Infrared (SBG-TIR) Project *(Invited Paper)*

Author(s): Ralph R. Basilio, Jet Propulsion Lab. (United States)

4 September 2023 • 13:00 - 13:30 | E104

12729-20

Overview of the imaging spectrometer instrument for NASA's Surface Biology and Geology Mission

Author(s): Amit Sen, Jet Propulsion Lab. (United States)

4 September 2023 • 13:30 - 13:50 | E104

12729-22

Global L-band Observatory for Water cycle Studies (GLOWS): soil Moisture continuity mission

Author(s): Rajat Bindlish, NASA Goddard Space Flight Ctr. (United States); David Long, Brigham Young Univ. (United States); Jeffrey Piepmeier, NASA Goddard Space Flight Ctr. (United States); Mark Bailey, MMA Design, LLC (United States)

4 September 2023 • 13:50 - 14:10 | E104

12729-23

Pulse response of the shortwave infrared detection system of the ocean color instrument for the NASA PACE Mission

Author(s): Ulrik Gliese, KBR, Inc. (United States); Zakk Rhodes, Kenny Squire, Space Dynamics Lab. (United States); Kim S. Jepsen, Science Systems and Applications, Inc. (United States); Brian Cairns, NASA Goddard Institute for Space Studies (United States); Brian L. Clemons, NASA Goddard Space Flight Ctr. (United States); James Cook, Roy Esplin, Space Dynamics Lab. (United States); Robert H. Estep, NASA Goddard Space Flight Ctr. (United States); Eric T. Gorman, NASA Goddard Space Flight Ctr. (United States), Quantum Space (United States); Emily Kan, Gerhard Meister, NASA Goddard Space Flight Ctr. (United States); Wei Lu, NOVA Federal (United States); David B. Mott, NASA Goddard Space Flight Ctr. (United States); Fred S. Patt, Science Applications International Corp. (United States); James Peterson, Space Dynamics Lab. (United States); Richard G. Schnurr, NASA Goddard Space Flight Ctr. (United States)

4 September 2023 • 14:10 - 14:30 | E104

12729-24

Measurement Techniques for the High-Contrast and In-Field Stray Light Performance of OCI

Author(s): Joseph J. Knuble, Gerhard Meister, NASA Goddard Space Flight Ctr. (United States); Hyeungu Choi, Global Science & Technology, Inc. (United States); Nicholas Collins, Telophase Corp. (United States); Kim S. Jepsen, Science Systems and Applications, Inc. (United States); Shihyan Lee, Science Applications International Corp. (United States); Robert Bousquet, Genesis Engineering Solutions, Inc. (United States); William Cook, NASA Goddard Space Flight Ctr. (United States); Colby Jurgenson, Harvard-Smithsonian Ctr. for Astrophysics (United States); Ulrik Gliese, Stinger Ghaffarian Technologies, Inc. (United States); Eric T. Gorman, Quantum Space (United States); Jim McCarthy, Stellar Solutions (United States)

4 September 2023 • 14:30 - 14:50 | E104

12729-25

Applications of T2SL barrier infrared detectors in observational instruments

Author(s): Sarath D. Gunapala, David Z. Ting, Alexander Soibel, Sir B. Rafol, Sam A. Keo, Arezou Khoshakhlagh, Brian J. Pepper, Anita M. Fisher, Cory J. Hill, William R. Johnson, Olga Kalashnikova, Michael J. Garay, Ashley G. Davies, Jet Propulsion Lab. (United States); Ashok Sood, John Zeller, Magnolia Optical Technologies, Inc. (United States); Christopher David, Anduril Industries, Inc. (United States); Paul G. Lucey, Miguel Nunes, Robert Wright, Univ. of Hawai'i (United States); Sachidananda Babu, Parminder Ghuman, NASA Earth Science Technology Office (United States)

4 September 2023 • 14:50 - 15:10 | E104

12729-26

GeoXO lightning mapper (LMX) engineering demonstrator unit design and silicon results

Author(s): Jerome Pratlong, Rafael Gil-Otero, Georgios Tsiolis, Teledyne e2v UK Ltd. (United Kingdom)

4 September 2023 • 15:10 - 15:30 | E104

Coffee Break 15:30 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

SESSION 6: EUROPEAN MISSIONS AND TECHNOLOGY II

5 September 2023 • 10:40 - 12:10 | E104
Session Chair: Arnaud Hélière,
European Space Agency (Netherlands)

12729-27

Meteosat Third Generation (MTG) Satellites series overall status: the launch and in-orbit characterisation of the first imagery mission of MTG *(Invited Paper)*

Author(s): Donny M. Aminou, Paul A. Blythe, Alex Palacios, Pierre Kokou, Pieter Ven Den Braembussche, James Champion, European Space Research and Technology Ctr. (Netherlands); Gary Fowler, Mounir Lekouara, EUMETSAT (Germany); Francis Olivier, Philippe Martin, Olivier Brize, Guillaume De Roquefeuil, Thales Alenia Space (France); Carlo Simoncelli, Guia Pastorini, Lorenzo Giunti, Leonardo S.p.A. (Italy)

5 September 2023 • 10:40 - 11:10 | E104

12729-28

In-orbit monitoring of the EUMETSAT Polar System-Second Generation (EPS-SG) visible/infrared imager (METimage) polarisation sensitivity using the Multi-View, Multi-Channel, Multi-Polarisation Imager (3MI)

Author(s): Pepe L. Phillips, Bertrand Fougnie, EUMETSAT (Germany)

5 September 2023 • 11:10 - 11:30 | E104

12729-29

Night-time remote sensing: understanding the science and measurement challenges

Author(s): Luca Schifano, Wilfried Glastre, Matthias Drusch, Arnaud Hélière, European Space Agency (Netherlands)

5 September 2023 • 11:30 - 11:50 | E104

12729-31

Status on the development of the Copernicus CO2M mission: monitoring anthropogenic carbon dioxide from space

Author(s): Yannig Durand, European Space Agency (Netherlands); Charlotte Pachot, European Space Research and Technology Ctr. (Netherlands)

5 September 2023 • 11:50 - 12:10 | E104

Lunch/Exhibition Break 12:10 - 13:40

SESSION 7: SMALLSAT

5 September 2023 • 13:40 - 15:00 | E104
Session Chair: Arnaud Hélière,
European Space Agency (Netherlands)

12729-32

Detector characterization and upcoming instrument calibration of an improved SPEXone, the five-angle spectro-polarimeter for the NASA PACE mission

Author(s): Jochen Campo, Marijn Siemons, Matej Arko, Paul Tol, Jeroen Rietjens, Alexander Eigenraam, Joris van der Vlugt, Jelle Talsma, Simon Rosman, SRON Netherlands Institute for Space Research (Netherlands); Robbert Winkelman, Airbus Defence and Space Netherlands (Netherlands); Jos Dingjan, Airbus Defence and Space (Netherlands); Jeroen Peters, Airbus Defence and Space Netherlands (Netherlands); Bastiaan van Diedenhoven, Ruud Hoogeveen, SRON Netherlands Institute for Space Research (Netherlands)

5 September 2023 • 13:40 - 14:00 | E104

12729-33

A multispectral polarimetric instrument design based on metasurface filters

Author(s): Tiberiu Ceccotti, Benjamin Brenny, Giampiero Gerini, Anton Leemhuis, Jérôme Caron, Nurcan Koc Alpay, TNO (Netherlands)

5 September 2023 • 14:00 - 14:20 | E104

12729-34

Miniature waveguide filters for large-scale terahertz Earth observation

Author(s): Adrian Gomez-Torrent, James Campion, Bernhard Beuerle, TeraSi AB (Sweden)

5 September 2023 • 14:20 - 14:40 | E104

12729-35

Implementation of the Φsat-2 on board image processing chain

Author(s): Nicola Melega, European Space Research and Technology Ctr. (Netherlands); Nicolas Longepe, European Space Research Institute (Italy); Valentina Marchese, Agne Paskeviciute, European Space Research and Technology Ctr. (Netherlands); Oriol Aragon, Irina Babkina, Open Cosmos Ltd. (United Kingdom); Alessandro Marin, CGI Inc. (Italy); Jakub Nalepa, KP Labs Sp. z o.o. (Poland); Léonie Buckley, Ubotica Technologies Ltd. (Ireland); Giorgia Guerrisi, GEO-K s.r.l. (Italy)

5 September 2023 • 14:40 - 15:00 | E104

Coffee Break 15:00 - 15:30

SESSION 8: ON GROUND AND ON ORBIT CALIBRATION I

5 September 2023 • 15:30 - 17:30 | E104
Session Chair: Xiaoxiong Xiong,
NASA Goddard Space Flight Ctr. (United States)

12729-37

Breadboarding and performance testing of a miniaturized stimulus for on-board calibration of space optical instruments

Author(s): Pierluigi Foglia Manzillo, Robert Rengelink, Moos A. Müller, James Harpur, Marco Esposito, cosine Remote Sensing B.V. (Netherlands)

5 September 2023 • 15:30 - 15:50 | E104

12729-38

Analysis of atmospheric turbulence-induced beam deviation for LEO/GEO FSO communication link

Author(s): Haider Al-Juboori, Institute of Technology Carlow (Ireland), South East Technological Univ. (Ireland)

5 September 2023 • 15:50 - 16:10 | E104

12729-40

Ground systems software for automatic operation of the HYPSO-2 hyperspectral imaging satellite

Author(s): Simen Berg, Sivert Bakken, Joseph L. Garrett, Tor A. Johansen, Norwegian Univ. of Science and Technology (Norway)

5 September 2023 • 16:10 - 16:30 | E104

12729-41

In-orbit VNIR sensor quality validation

Author(s): Johannes Buschek, Andreas Eckardt, Kristian Manthey, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Karsten Sengebusch, Eureca Messtechnik GmbH (Germany); Olaf Schrey, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme IMS (Germany); Denis Piechaczek, Fraunhofer Institute for Microelectronic Circuits and Systems (IMS) (Germany); Gerhard Kahmen, IHP GmbH (Germany)

5 September 2023 • 16:30 - 16:50 | E104

12729-50

Satellite lunar observation and analysis

Author(s): Chunling Lu, Bin Wu, Zhaoguang Bai, DFH satellite Co. Ltd. (China)

5 September 2023 • 16:50 - 17:10 | E104

12729-59

A new snapshot spectral imaging technology for space targets

Author(s): Lisha Zhang, Jing-Jing Ge, Beijing Institute of Space Mechanics and Electricity (China)

5 September 2023 • 17:10 - 17:30 | E104

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12729-51

Fire type detection and online quick analysis based on multi-source fire data

Author(s): Pengyu Zhang, Jianbo Duan, Dacheng Wang, Aerospace Information Research Institute (China); Caihong Ma, Aerospace Information Research Institute (China), Beijing Forestry Univ. (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-52

Introducing the EarthDaily Constellation, a scientific-grade earth observation mission with daily revisit time

Author(s): Harold Clenet, Arnaud Quesney, Nicolas Karasiak, Aubin Allies, Tatiana Dias Tardelli Uehara, Alexis Durand, Caroline Gevaert, Bevan Glynn, Clément Peyrard, Luisa Walsh, Guillaume Huby, Cécile Tartarin, EarthDaily Agro (France)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-53

NOAA-21 VIIRS day-night band on-orbit calibration and performance in early mission

Author(s): Hongda Chen, Junqiang Sun, Daniel Link, Science Systems and Applications, Inc. (United States), NASA (United States); Chengbo Sun, Global Science & Technology, Inc. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States); Kwofu V. Chiang, Science Systems and Applications, Inc. (United States)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-54

A compact and rugged hyperspectral camera for remote sensing based on FT spectrometry

Author(s): Cristian Manzoni, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Matteo Corti, Benedetto Ardini, Politecnico di Milano (Italy); Fabrizio Preda, Antonio Perri, NIREOS SRL (Italy); Dario Polli, Politecnico di Milano (Italy), NIREOS SRL (Italy), CNR-Istituto di Fotonica e Nanotecnologie (Italy); Giulio Cerullo, Politecnico di Milano (Italy), CNR-Istituto di Fotonica e Nanotecnologie (Italy), NIREOS (Italy); Ondřej Ballada, Lukáš Chroust, Čestmír Barta, BBT-Materials Processing, s.r.o. Ltd. (Czech Republic)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-55

NOAA-21 VIIRS thermal emissive bands on-orbit calibration and performance in early mission

Author(s): Kwofu V. Chiang, Amit Angal, Tiejun Chang, Sherry Li, Science Systems and Applications, Inc. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-57

Active optics for a formation flying synthetic aperture telescope

Author(s): Norihide Miyamura, Meisei Univ. (Japan); Ryo Suzumoto, ArkEdge Space Inc. (Japan); Satoshi Ikari, Shinichi Nakasuka, The Univ. of Tokyo (Japan)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-58

Research on development and application of visualization technology of moving object flow

Author(s): Yue Zhang, Beijing Institute of Space Mechanics and Electricity (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-60

A correcting nonliner imaging spectrometer based on prism with large-field-of-view

Author(s): Lei Feng, Aerospace Information Research Institute (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12729-62

Influence of motion compensation on the imaging quality of encoded aperture imaging spectrometer

Author(s): Zhen Li, Institute of Remote Sensing Satellite, China Academy of Space Technology (China), College of Computer Science and Technology, Zhejiang Univ. (China); Shaocong Liu, Xianfei Qiu, Tinghao Liu, Institute of Remote Sensing Satellite, China Academy of Space Technology (China); Guorui Jia, Key Laboratory of Education Ministry of Precision Opto-mechatromics Technology, School of Instrument (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

SESSION 9: ON GROUND AND ON ORBIT CALIBRATION II

6 September 2023 • 09:00 - 10:30 | E104
Session Chair: Xiaoxiong Xiong,
NASA Goddard Space Flight Ctr. (United States)

12729-42

An overview of NOAA-21 VIIRS early on-orbit calibration and performance *(Invited Paper)*

Author(s): Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States); Amit Angal, Junqiang Sun, Ning Lei, Kevin Twedt, Hongda Chen, Kwofu V. Chiang, Science Systems and Applications, Inc. (United States)

6 September 2023 • 09:00 - 09:30 | E104

12729-43

Impacts of orbital drift on the MODIS lunar calibration

Author(s): Truman M. Wilson, Amit Angal, Science Systems and Applications, Inc. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States)

6 September 2023 • 09:30 - 09:50 | E104

12729-44

Characterization of the VIIRS DNB mid-gain stage using observations of bright stars

Author(s): Truman M. Wilson, Science Systems and Applications, Inc. (United States); Xiaoxiong Xiong, NASA Goddard Space Flight Ctr. (United States)

6 September 2023 • 09:50 - 10:10 | E104

12729-45

PACE OCI crosstalk characterization based on pre-launch testing

Author(s): Shihyan Lee, Gerhard Meister, Samuel Kitchen, Joseph Knuble, Ulrik Gliese, Robert Bousquet, NASA Goddard Space Flight Ctr. (United States)

6 September 2023 • 10:10 - 10:30 | E104

Coffee Break 10:30 - 11:00

SESSION 10: ON GROUND AND ON ORBIT CALIBRATION III

6 September 2023 • 11:00 - 12:20 | E104
Session Chair: Xiaoxiong Xiong,
NASA Goddard Space Flight Ctr. (United States)

12729-46

A numerical model for the ALTIUS instrument performance assessment

Author(s): Dennis Göhner, David Bühler, Nicolas Saillen, Luciana Montrone, Daniel Navarro-Reyes, Michael Francois, European Space Agency (Netherlands); Ludovic Aballea, OIP N.V. (Belgium)

6 September 2023 • 11:00 - 11:20 | E104

12729-47

OzFuel: a space-based forest fuel flammability monitoring mission

Author(s): Nicolas Younes, Marta Yebra, Robert Sharp, The Australian National Univ. (Australia)

6 September 2023 • 11:20 - 11:40 | E104

12729-48

Development of a 1U new space camera for EMCCD and CCD sensors with enhanced low-light sensitivity

Author(s): Olivier Daigle, Sarah Bouguéroua, Nüvü Cameras Inc. (Canada); Oleg Djazovski, Canadian Space Agency (Canada); René Doyon, Univ. de Montréal (Canada); Marie-Eve Ducharme, Nüvü Cameras Inc. (Canada); Jean Dupuis, Canadian Space Agency (Canada); Adam Gilbert, Nüvü Cameras Inc. (Canada); Farbod Jahandar, Univ. de Montréal (Canada); Jeremy Turcotte, Nüvü Cameras Inc. (Canada)

6 September 2023 • 11:40 - 12:00 | E104

12729-49

Deep Spectral Imaging (DSI): an optimized AI-based spectral imaging acquisition, transmission, and calibration

Author(s): Marcello Melis, Profilocolore Srl (Italy); Enrico Saggese, On-Air Consulting & Solutions Srl (Italy); Marco Muzi, Matteo Fois, Profilocolore Srl (Italy)

6 September 2023 • 12:00 - 12:20 | E104

Conference 12730

Remote Sensing of Clouds and the Atmosphere XXVIII

5 - 6 September 2023 | Rooms D204 (Tue) & E105-106 (Wed)

Conference Chairs: **Adolfo Comerón,** Univ. Politècnica de Catalunya (Spain); **Evgueni I. Kassianov,** Pacific Northwest National Lab. (United States); **Klaus Schäfer,** Atmospheric Physics Consulting (Germany)

Conference Co-Chairs: **Richard H. Picard,** ARCON Corp. (United States); **Konradin Weber,** Fachhochschule Düsseldorf (Germany)

Programme Committee: **Lucas Alados-Arboledas,** Univ. de Granada (Spain); **Aldo Amodeo,** Istituto di Metodologie per l'Analisi Ambientale (Italy); **Young Joon Kim,** Gwangju Institute of Science and Technology (Republic of Korea)

TUESDAY 5 SEPTEMBER 2023

SESSION 1: REMOTE SENSING OF CLOUDS, AEROSOLS, TRACE GASES AND METEOROLOGICAL PARAMETERS I

5 September 2023 • 09:00 - 10:20 | D204
Session Chair: Adolfo Comerón,
Univ. Politècnica de Catalunya (Spain)

12730-1
An overview of the enhanced cloud and water vapour products from EUMETSAT new generation imagers
Author(s): Loredana Spezzi, Alessio Bozzo, John Jackson, Hans Joachim Lutz, Andre Belo do Couto, Phillip Watts, Thomas August, Bertrand Fougnie, Bojan Bojkov, EUMETSAT (Germany)
5 September 2023 • 09:00 - 09:20 | D204

12730-2
Analysis and applications of the Geostationary Environment Monitoring Spectrometer (GEMS) data
Author(s): Kyunghwa Lee, Mijeong Kim, Jaehoon Jeong, Goo Kim, Dongwon Lee, National Institute of Environmental Research (Republic of Korea); Jhoon Kim, Yonsei University (Republic of Korea)
5 September 2023 • 09:20 - 09:40 | D204

12730-3
New progress in the carbon knowledge and data integrating system
Author(s): Jing Zhao, Guoqing Li, Zugang Chen, Aerospace Information Research Institute (China)
5 September 2023 • 09:40 - 10:00 | D204

12730-4
Cloud detection on satellite imagery using U-Net architecture
Author(s): Alexis Vandoit, Total S.A. (France); Benoit Blanco, Léo Turon, Clément Killisly, TotalEnergies SE (France)
5 September 2023 • 10:00 - 10:20 | D204

Coffee Break 10:20 - 10:50

SESSION 2: REMOTE SENSING OF CLOUDS, AEROSOLS, TRACE GASES AND METEOROLOGICAL PARAMETERS II

5 September 2023 • 10:50 - 12:40 | D204
Session Chair: Adolfo Comerón,
Univ. Politècnica de Catalunya (Spain)

12730-5
Simultaneous retrieval from the full IASI spectrum of cloud and atmospheric parameters using the new all-sky forward model sigma-IASI/F2N: the first day-night infrared retrieval of the Antarctica ozone hole
(Keynote Presentation)
Author(s): Carmine Serio, Guido Masiello, Giuliano Liuzzi, Univ. degli Studi della Basilicata (Italy); Pietro Mastro, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Pamela Pasquariello, Univ. degli Studi della Basilicata (Italy)
5 September 2023 • 10:50 - 11:20 | D204

12730-7
Analysis of atmospheric aerosol properties using lidar measurements and their impact on radiative budget in Barcelona over the past 20 years
Author(s): Simone Lolli, Istituto di Metodologie per l'Analisi Ambientale (Italy), Univ. Politècnica de Catalunya (Spain); Michael Sicard, Adolfo Comeron, Cristina Gil-Diaz, Daniel Camilo Dos Santos Oliveira, Univ. Politècnica de Catalunya (Spain); Tony C. Landi, Istituto di Scienze dell'Atmosfera e del Clima (Italy); Alejandro Rodriguez-Gomez, Constantino Munoz-Porcar, Federico Dios Otin, Univ. Politècnica de Catalunya (Spain)
5 September 2023 • 11:20 - 11:40 | D204

12730-8
In search of a location-centric freezing height model
Author(s): Rajasri Sen Jaiswal, Thirumala Lakshmi K., Siva M., Sona College of Technology (India)
5 September 2023 • 11:40 - 12:00 | D204

12730-9
Investigating atmospheric and convective boundary layer heights via active optical sensor signals and statistical techniques
Author(s): Kamana Mishra, Indian Institute of Technology Mandi (India); Bhavani Kumar Yellapragada, National Atmospheric Research Lab. (India)
5 September 2023 • 12:00 - 12:20 | D204

12730-10

Cloud detection using SDGSAT-1 thermal infrared data

Author(s): Caihong Ma, Yanmei Xie, Aerospace Information Research Institute (China), China Univ. of Mining and Technology (China); Guangtong Wan, Aerospace Information Research Institute (China); Hongyu Chen, Bihong Fu, Innovation Academy for Microsatellites of CAS (China)

5 September 2023 • 12:20 - 12:40 | D204

Lunch/Exhibition Break 12:40 - 14:00

SESSION 3: RADIATIVE TRANSFER AND APPLICATIONS

5 September 2023 • 14:00 - 15:20 | D204
Session Chair: Adolfo Comerón,
Univ. Politècnica de Catalunya (Spain)

12730-11

Comparison of unfiltered CERES shortwave radiances measured in the minor plane over snow/ice of Greenland during summer solstices

Author(s): Z. Peter Szewczyk, Science Systems and Applications, Inc. (United States)

5 September 2023 • 14:00 - 14:20 | D204

12730-12

Comparison of the IASI water deficit index and other vegetation indices: the case study of the intense 2022 drought over the Po Valley

Author(s): Fabio Della Rocca, Univ. degli Studi di Napoli Federico II (Italy); Italia De Feis, Istituto per le Applicazioni del Calcolo "Mauro Picone" (Italy); Pamela Pasquariello, Guido Masiello, Carmine Serio, Univ. degli Studi della Basilicata (Italy)

5 September 2023 • 14:20 - 14:40 | D204

12730-13

Innovative remote-sensed thermodynamical indices to identify vegetation stress and surface dryness: application to southern Italy over the last decade

Author(s): Pamela Pasquariello, Guido Masiello, Carmine Serio, Univ. degli Studi della Basilicata (Italy); Pietro Mastro, Univ. degli Studi della Basilicata (Italy), Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Giuliano Liuzzi, Univ. degli Studi della Basilicata (Italy); Fabio Della Rocca, Univ. degli Studi di Napoli Federico II (Italy); Italia De Feis, Istituto per le Applicazioni del Calcolo "Mauro Picone" (Italy)

5 September 2023 • 14:40 - 15:00 | D204

12730-14

Bytran version 1.5

Author(s): Denis Pliutau, Bytran (United States)

5 September 2023 • 15:00 - 15:20 | D204

Coffee Break 15:20 - 15:50

SESSION 4: TECHNOLOGIES, TECHNIQUES AND ALGORITHMS FOR ACTIVE AND PASSIVE REMOTE SENSING I

5 September 2023 • 15:50 - 17:10 | D204
Session Chair: Adolfo Comerón,
Univ. Politècnica de Catalunya (Spain)

12730-15

Retrieval of water vapor in the atmosphere and its spectral content: from OLCI to GPS

Author(s): Gaël Kermarrec, Leibniz Univ. Hannover (Germany); Xavier Calbet, Agencia Estatal de Meteorología (Spain); Zhiguo Deng, Helmholtz-Zentrum Potsdam (Germany); Cintia Carbajal Henken, Institute of Meteorology, Freie Univ. Berlin (Germany); Rene Preusker, Institute of Meteorology (Germany)

5 September 2023 • 15:50 - 16:10 | D204

12730-16

A new method of retrieving atmospheric refractivity

Author(s): Ollie Lewis, Chris Brunt, Univ. of Exeter (United Kingdom); Malcolm Kitchen, Met Office (United Kingdom); Sean Healy, European Ctr. for Medium-Range Weather Forecasts (United Kingdom); Neill Bowler, Met Office (United Kingdom)

5 September 2023 • 16:10 - 16:30 | D204

12730-18

Study of spatial distributions of aerosol in the troposphere according to the data of the DELICAT

Author(s): Alex Mamontov, A. M. Obukhov Institute of Atmospheric Physics of the RAS (Russian Federation)

5 September 2023 • 16:30 - 16:50 | D204

12730-19

CarbonNET: carbon dioxide retrieval from satellite using neural networks

Author(s): Pietro Mastro, Univ. degli Studi della Basilicata (Italy), Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Carmine Serio, Guido Masiello, Univ. degli Studi della Basilicata (Italy)

5 September 2023 • 16:50 - 17:10 | D204

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at
https://spie.org/ESI/poster-presentation-guidelines

12730-25

Verification of reproducibility of biomass burning aerosol distribution by regional modeling

Author(s): Makiko Nakata, Kindai Univ. (Japan); Souichiro Hioki, Univ. de Lille (France); Sonoyo Mukai, The Kyoto College of Graduate Studies for Informatics (Japan)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12730-26

Significance of simultaneous observations of polarization and radiance with SGLI

Author(s): Sonoyo Mukai, The Kyoto College of Graduate Studies for Informatics (Japan); Souichiro Hioki, Univ. de Lille (France); Makiko Nakata, Kindai Univ. (Japan); Toshiyuki Fujito, The Kyoto College of Graduate Studies for Informatics (Japan); Itaru Sano, Kindai Univ. (Japan)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12730-27

Determining background concentrations of major atmospheric pollutants using Sentinel-5P TROPOMI data

Author(s): Plamen Trenchev, Maria Dimitrova, Daniela Avetisyan, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12730-28

Spatiotemporal behavior of atmospheric pollutant ingredients over Bulgaria, based on open access GAMS data

Author(s): Maria Dimitrova, Plamen Trenchev, Daniela Avetisyan, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12730-29

Measurements and prediction of the atmosphere surface layer electric field

Author(s): Aida A. Adzhieva, Kabardino-Balkarian State Agricultural Univ. (Russian Federation); Vitaly A. Shapovalov, Idar Kh. Mashukov, High-Mountain Geophysical Institute (Russian Federation); Anton S. Boldyreff, Southern Federal Univ. (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12730-30

Machine learning clustering of cloud regimes using synergetic ground-based remote sensing observations

Author(s): Andreu Julián-Izquierdo, Patricia García-Pitarch, Francesco Scarlatti, Pedro C. Valdelomar, José Luis Gómez-Amo, Pilar Utrillas, Univ. de València (Spain)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12730-31

Exploring the aerosol-cloud transition zone from advanced all-sky camera observations

Author(s): Francesco Scarlatti, Javier Tarín, José Luis Gómez-Amo, Pedro C. Valdelomar, Pilar Utrillas, Univ. de València (Spain)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

WEDNESDAY 6 SEPTEMBER 2023

SESSION 5: TECHNOLOGIES, TECHNIQUES AND ALGORITHMS FOR ACTIVE AND PASSIVE REMOTE SENSING II

6 September 2023 • 08:30 - 10:10 | Room E105-106
Session Chair: Adolfo Comerón,
Univ. Politècnica de Catalunya (Spain)

NOTE THE ROOM CHANGE.

Conference 12730 will run in room E105-106 on Wednesday.

12730-20

Dual comb integrated path DIAL lidar for gas monitoring: design and experimental implementation

Author(s): William Patiño-Rosas, Nicolas Cézard, ONERA (France)

6 September 2023 • 08:30 - 08:50 | Room E105-106

12730-21

Observation of horizontal temperature variations by a limb-sounding spatial heterodyne interferometer

Author(s): Konstantin Ntokas, Martin Kaufmann, Jörn Ungermann, Tom Neubert, Martin Riese, Forschungszentrum Jülich GmbH (Germany)

6 September 2023 • 08:50 - 09:10 | Room E105-106

12730-22

Worldwide high-frequency weather forecasts for the optimization of Earth observation satellites planning

Author(s): Guillaume Roussel, Mathieu Turpin, Reuniwatt (France); Benjamin Marchand, Thales Alenia Space (France); Guillaume Jubelin, IRT Saint Exupéry (France)

6 September 2023 • 09:10 - 09:30 | Room E105-106

12730-23

Robust molecular wind lidar with Quadri Mach-Zehnder interferometer and UV fiber laser for calibration/validation and future generation of Aeolus

Author(s): Thibault Boulant, Matthieu Valla, ONERA (France); Jean-François Mariscal, Nicolas Rouanet, Lab. Atmosphères, Milieux, Observations Spatiales (France); David Tomline Michel, ONERA (France)

6 September 2023 • 09:30 - 09:50 | Room E105-106

12730-24

Digital holography for temperature investigations in space and transparent media

Author(s): Davood Khodadad, Umeå Univ. (Sweden); Behnam Tayebi, NYU Grossman School of Medicine (United States)

6 September 2023 • 09:50 - 10:10 | Room E105-106

Conference 12731

Environmental Effects on Light Propagation and Adaptive Systems VI

5 - 6 September 2023 | E107

Conference Chairs: **Karin Stein,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Szymon Gladysz,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Programme Committee: **Eyal Agassi,** Israel Institute for Biological Research (Israel); **Ivo Buske,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Christian Eisele,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Luc Labarre,** ONERA (France); **Andrew J. Lambert,** UNSW Canberra (Australia); **Vladimir P. Lukin,** V.E. Zuev Institute of Atmospheric Optics (Russian Federation); **Florian Moll,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Andreas Muschinski,** NorthWest Research Associates (United States); **Darío G. Pérez,** Pontificia Univ. Católica de Valparaíso (Chile); **Andrew P. Reeves,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Italo Toselli,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Alexander M. J. van Eijk,** TNO Defence, Security and Safety (Netherlands); **Arthur D. van Rheenen,** Norwegian Defence Research Establishment (Norway); **Vladimir Yurievich Venediktov,** Saint Petersburg Electrotechnical Univ. "LETI" (Russian Federation), St.-Petersburg State Univ. (Russian Federation); **Oskar F. von der Lühe,** Leibniz-Institut für Sonnenphysik (KIS) (Germany); **Henry White,** BAE Systems (United Kingdom)

INFORMATION

This year's conference is dedicated to the memory of:

Anton Kohnle
retired, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

1994-2009 chair of the conference on Optics in Atmospheric Propagation and Adaptive Systems

2003-2004 SPIE Remote Sensing symposium chair

TUESDAY 5 SEPTEMBER 2023

SESSION 1: TRIBUTE TO ANTON KOHNLE: IN-MEMORIAM SESSION

5 September 2023 • 13:10 - 15:00 | E107

Session Chair: Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

MEMORIAL SESSION IN HONOR OF DR. ANTON KOHNLE

Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB, Germany (retired)

1994-2009 Chair of the Conference on Optics in Atmospheric Propagation and Adaptive Systems

This session is dedicated to the career and memory of Anton Kohnle for his numerous outstanding research contributions and leadership in the field of atmospheric optics, and to his legacy inspiring greatness and compassion.

12731-1
Tribute to Anton Kohnle
Author(s): Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 13:10 - 13:30 | E107

12731-2
Wavefront sensing and control in strong scintillations, target-induced speckles, and beacon anisoplanatism : an overview *(Invited Paper)*
Author(s): Mikhail A. Vorontsov, Univ. of Dayton (United States)
5 September 2023 • 13:30 - 14:00 | E107

12731-3
An electrooptical propagation and signature experiment in a humid environment
Author(s): Christian Eisele, Dirk Seiffer, Erik Sucher, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 14:00 - 14:20 | E107

12731-4
Improving Cn2 calculations during stable conditions using an ultrasonic anemometer
Author(s): Yaakov Monsa, Mara Baraban, Bar Peled, Rafael Advanced Defense Systems Ltd. (Israel)
5 September 2023 • 14:20 - 14:40 | E107

12731-5
Performance and limits of a Kramers-Kronig self-coherent receiver in a turbulent 800 m free-space optical link
Author(s): Raphael Bellossi, Douglas McDonald, Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 14:40 - 15:00 | E107

Coffee Break 15:30 - 16:00

SESSION 2: FIELD TRIAL OF NATO SET 304

5 September 2023 • 15:30 - 17:00 | E107
Session Chair: Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12731-6
Goals and achievements of NATO SET 304
Author(s): Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 15:30 - 15:40 | E107

12731-7
Turbulence characterization and investigation of correlations to meteorological parameters: results from NATO SET-304 Field Trial in Le Fauga-Mauzac, France
Author(s): Jens Grundmark, Markus Henriksson, FOI-Swedish Defence Research Agency (Sweden)
5 September 2023 • 15:40 - 16:00 | E107

12731-8
Measuring and modeling the influence of atmospheric turbulence on a 2-µm laser beam
Author(s): Utku Görkem Yasa, TÜBITAK BILGEM ILTAREN (Turkey); Mehmet Z. Keskin, TÜBITAK BILGEM (Turkey); Ziya Gürkan Figen, TÜBITAK BILGEM ILTAREN (Turkey); Espen Lippert, Helge Fonnum, Norwegian Defence Research Establishment (Norway)
5 September 2023 • 16:00 - 16:20 | E107

12731-9
Optical turbulence on 1 km horizontal path with short and medium IR Gaussian laser beams
Author(s): Andreas U. Schiller, Espen Lippert, Helge Fonnum, Norwegian Defence Research Establishment (FFI) (Norway)
5 September 2023 • 16:20 - 16:40 | E107

12731-10
Performance of phase diversity phase retrieval for horizontal path long-range imaging
Author(s): Nicolas Boehrer, Robert P. J. Nieuwenhuizen, Judith Dijk, TNO (Netherlands)
5 September 2023 • 16:40 - 17:00 | E107

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall
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View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12731-29
A study on the automatic extraction of trajectory for LIDAR data correction
Author(s): YeongJae Jang, Keunyong Kim, Joo-Hyung Ryu, Korea Institute of Ocean Science & Technology (Republic of Korea)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

12731-30
Turbulence mitigation pipelines evaluation
Author(s): Nicolas Boehrer, Pieter J. Piscaer, Gerhard C. Reeling Brouwer, Robert P. J. Nieuwenhuizen, Judith Dijk, TNO (Netherlands)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

WEDNESDAY 6 SEPTEMBER 2023

SESSION 3: PROPAGATION IN MARITIME ENVIRONMENT

6 September 2023 • 09:00 - 10:00 | E107
Session Chair: Christian Eisele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12731-12
High-resolution modeling of the spatiotemporal variations in aerosol extinction in a complex coastal area
Author(s): Alix Limoges, Mediterranean Institute of Oceanography (France); Christophe Yohia, OSU Institut Pythéas (France), Aix-Marseille Univ. (France); Quentin Rodier, Ctr. National de Recherches Météorologiques (France); Alexander M. J. van Eijk, TNO (Netherlands); Jacques Piazzola, Mediterranean Institute of Oceanography (France)
6 September 2023 • 09:00 - 09:20 | E107

12731-13
Comparison of atmospheric optical turbulence measurements from a scintillometer and a sonic anemometer
Author(s): Wyatt Smith, Charles Nelson, John Burkhardt, Cody Brownell, U.S. Naval Academy (United States)
6 September 2023 • 09:20 - 09:40 | E107

12731-14
Laser beam propagation over the sea surface: experimental data and verification of simulations
Author(s): Loes C. W. Scheers, Gregal Vissers, Ariadna I. Huerta Viso, Roderik A. Overzier, Sven A. van Binsbergen, Aleid P. C. Oosterwijk, Alexander M. J. van Eijk, TNO (Netherlands); Erik Sucher, Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
6 September 2023 • 09:40 - 10:00 | E107

Coffee Break 10:00 - 10:30

SESSION 4: FIELD TRIALS

6 September 2023 • 10:30 - 11:40 | E107
Session Chair: Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12731-16
Propagation geometry and its effect on peak scintillation of intensity (Invited Paper)
Author(s): Jeremy P. Bos, Michigan Technological Univ. (United States)
6 September 2023 • 10:30 - 11:00 | E107

12731-17
Turbulence and transmission effects on laser beam propagation in the SWIR and LWIR bands
Author(s): Mattias Rahm, Fredrik Kullander, Lars Sjöqvist, Matts Björck, FOI-Swedish Defence Research Agency (Sweden)
6 September 2023 • 11:00 - 11:20 | E107

12731-18
Does atmospheric turbulence affect long-range terrestrial laser scanner observations? A case study in Alpine region
Author(s): Gael Kermarrec, Leibniz Univ. Hannover (Germany); Daniel Czerwonka-Schröder, DMT GmbH & Co. KG (Germany); Christoph Holst, Technische Univ. München (Germany)
6 September 2023 • 11:20 - 11:40 | E107

Lunch Break 11:40 - 13:30

SESSION 5: TURBULENCE MITIGATION

6 September 2023 • 13:30 - 15:00 | E107

Session Chair: Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12731-19

Event based sensor versatility for long range surveillance imaging *(Invited Paper)*

Author(s): Andrew J. Lambert, Campbell McLaughlin, The Univ. of New South Wales at the Australian Defence Force Academy (Australia)

6 September 2023 • 13:30 - 14:00 | E107

12731-20

Mitigation of inter-modal crosstalk in the holographic wavefront sensor through the implementation of a multi plane light conversion

Author(s): Peter Krause, René Berlich, Christian Vetter, Carlos Andres Sevilla Gutierrez, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany)

6 September 2023 • 14:00 - 14:20 | E107

12731-21

A compact pointing assembly for a CubeSat to ground station free-space optical communication based on a Risley prism scanner coarse and a tip/tilt mirror fine pointing

Author(s): Peter Krause, Daniel Heinig, Matthias Goy, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); Matthias Beier, Marcel Hornaff, SPACEOPTIX GmbH (Germany)

6 September 2023 • 14:20 - 14:40 | E107

12731-22

Optical demultiplexing with fractal-structured beams

Author(s): Luat T. Vuong, Xiaojing Weng, Univ. of California, Riverside (United States)

6 September 2023 • 14:40 - 15:00 | E107

Coffee Break 15:00 - 15:30

SESSION 6: NUMERICAL WEATHER PREDICTION AND WAVE OPTICS SIMULATIONS

6 September 2023 • 15:30 - 16:30 | E107

Session Chair: Alexander M. J. van Eijk, TNO (Netherlands)

12731-23

Sensitivity study on the number of height levels used in a numerical weather model to determine the vertical profile of Cn2

Author(s): Carmen Ullwer, Detlev Sprung, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Alexander M. J. van Eijk, TNO (Netherlands); Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

6 September 2023 • 15:30 - 15:50 | E107

12731-24

A multi-physics ensemble modeling framework for reliable C_n^2 estimation

Author(s): Maximilian Pierzyna, Sukanta Basu, Rudolf Saathof, Technische Univ. Delft (Netherlands)

6 September 2023 • 15:50 - 16:10 | E107

12731-25

Beyond Taylor's frozen turbulence hypothesis in ground-layer turbulence

Author(s): Darío G. Pérez, Pontificia Univ. Católica de Valparaíso (Chile); Ivan R. R. González, Pontificia Univ. Católica de Valparaíso (Chile), Univ. Federal Rural de Pernambuco (Brazil); Hishan Farfán, Pontificia Univ. Católica de Valparaíso (Chile)

6 September 2023 • 16:10 - 16:30 | E107

SESSION 7: FREE-SPACE OPTICAL COMMUNICATIONS

6 September 2023 • 16:30 - 17:10 | E107

Session Chair: Dario Perez, Lockheed Martin Corp. (United States)

12731-26

Power in the fiber for atmospheric turbulence-affected laser beams

Author(s): Italo Toselli, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

6 September 2023 • 16:30 - 16:50 | E107

12731-27

Performance analysis of OOK and PPM modulation schemes in MIMO-FSO links under gamma-gamma atmospheric turbulence

Author(s): Amine Benbouzid, Nabil Belghachem, Ecole Militaire Polytechnique (Algeria)

6 September 2023 • 16:50 - 17:10 | E107

Conference 12732

Microwave Remote Sensing: Data Processing and Applications II

6 September 2023 | E105-106

Conference Chairs: **Fabio Bovenga,** Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); **Claudia Notarnicola,** EURAC (Italy); **Nazzareno Pierdicca,** Sapienza Univ. di Roma (Italy); **Emanuele Santi,** Istituto di Fisica Applicata "Nello Carrara" (Italy)

Programme Committee: **Rajat Bindlish,** NASA Goddard Space Flight Ctr. (United States); **Maria-Paola Clarizia,** ESA-ESTEC (Netherlands); **Katarzyna Dabrowska-Zielinska,** Institute of Geodesy and Cartography (Poland); **Mihai P. Datcu,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Fabio Del Frate,** Univ. degli Studi di Roma "Tor Vergata" (Italy); **Horst Hammer,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Carlos Lopez-Martinez,** Univ. Politècnica de Catalunya (Spain); **Simonetta Paloscia,** Istituto di Fisica Applicata "Nello Carrara" (Italy); **Luca Pulvirenti,** CIMA Research Foundation (Italy); **Ronny Schomacker,** Technische Univ. Berlin (Germany); **David Small,** Univ. of Zürich (Switzerland); **Susan Steele-Dunne,** Technische Univ. Delft (Netherlands); **Hong Zhao,** Univ. Twente (Netherlands)

TUESDAY 5 SEPTEMBER 2023

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

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12732-14

The potential of SAR data for detecting deforestation in mountainous and sparse forested areas: the case of northern Portugal

Author(s): Ana Navarro, Tomás Castro, João Sá, João Catalão, Univ. de Lisboa (Portugal); Pedro Benevides, Direção-Geral do Território (Portugal); Hugo Costa, Mário Caetano, Direção-Geral do Território (Portugal), Univ. Nova de Lisboa (Portugal)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

12732-15

Surface deformation monitoring using KOMPSAT-5 images and time-series InSAR technique: a case study of volcanic eruption of Kilauea, Hawaii

Author(s): Seungjae Lee, Sung-Ho Chae, Kwang-Jae Lee, Korea Aerospace Research Institute (Republic of Korea)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

12732-16

Development of proto-type KOMPSAT-5 SAR image analysis tool for automatic change detection and cueing

Author(s): Sung-Ho Chae, Seungjae Lee, Kwang-Jae Lee, Korea Aerospace Research Institute (Republic of Korea)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

12732-17

The behaviour of PolInSAR coherence as a parameter for backscattering analysis and target characterization

Author(s): Sofiane Tahraoui, Institut of Aeronautics and Space Studies, Univ. Saad Dahlab Blida 1 (Algeria); Mounira Ouarzeddine, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

WEDNESDAY 6 SEPTEMBER 2023

SESSION 1: ENVIRONMENTAL APPLICATIONS

6 September 2023 • 11:00 - 12:00 | E105-106
Session Chair: Fabio Bovenga, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy)

12732-18

Detection of badland erosion by exploring time series of interferometric coherence and phase

Author(s): Alberto Refice, Fabio Bovenga, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Francesco P. Lovergine, Istituto di Studi sui Sistemi Intelligenti per l'Automazione (Italy); L. Partipilo, D. Capolongo, Univ. degli Studi di Bari Aldo Moro (Italy); Raffaele Nutricato, Davide Oscar Nitti, GAP S.r.l. (Italy)
6 September 2023 • 11:00 - 11:20 | E105-106

12732-19

Some progresses on InSAR and PolSAR investigations on soil moisture and forest monitoring

Author(s): Nazzareno Pierdicca, Giovanni Anconitano, Sapienza Univ. di Roma (Italy); Elena Arabini, Istituto di Scienze dell'Atmosfera e del Clima (Italy); Chiara Telli, Sapienza Univ. di Roma (Italy); Leila Guerriero, Univ. degli Studi di Roma "Tor Vergata" (Italy); Lorenzo Giuliano Papale, Sapienza Univ. di Roma (Italy); Marco Lavalle, Jet Propulsion Lab. (United States)
6 September 2023 • 11:20 - 11:40 | E105-106

12732-4

Remote sensing scene classification with masked image modeling

Author(s): Liya Wang, Alex Tien, The MITRE Corp. (United States)
6 September 2023 • 11:40 - 12:00 | E105-106
Break

Lunch Break 12:00 - 13:20

SESSION 2: SAR INTERFEROMETRY

6 September 2023 • 13:20 - 15:00 | E105-106
Session Chair: Nazzareno Pierdicca, Sapienza Univ. di Roma (Italy)

12732-5

Investigating radar cross sections of passive radar reflectors for C-band and X-band SAR satellite missions

Author(s): Alessandro Parisi, Politecnico di Bari (Italy); Raffaele Nutricato, Davide O. Nitti, GAP S.r.l. (Italy); Giovanni Preziosa, Antonella M. Loconsole, Francesco Prudenzano, Cataldo Guaragnella, Politecnico di Bari (Italy)

6 September 2023 • 13:20 - 13:40 | E105-106

12732-6

Exploiting artificial reflectors for SAR interferometry applications

Author(s): Davide O. Nitti, Raffaele Nutricato, Khalid Tijani, GAP S.r.l. (Italy); Fabio Bovenga, Alberto Refice, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Roberto Bellotti, Giovanni Preziosa, Antonio Mongelli, Univ. degli Studi di Bari Aldo Moro (Italy)

6 September 2023 • 13:40 - 14:00 | E105-106

12732-7

Linking urban intensification, groundwater storage and land subsidence analysis in Ludhiana city in Punjab, India using InSAR, GRACE and Landsat thermal data

Author(s): Shubham Awasthi, Indian Institute of Technology Roorkee (India); Koyel Sur, Punjab Remote Sensing Ctr. (India); Kamal Jain, Indian Institute of Technology Roorkee (India)

6 September 2023 • 14:00 - 14:20 | E105-106

12732-8

Differential SAR interferometry for snow water equivalent estimation over Alpine mountains

Author(s): Fabio Bovenga, Antonella Belmonte, Alberto Refice, Ilenia Argentiero, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy)

6 September 2023 • 14:20 - 14:40 | E105-106

12732-9

Alpine rock glacier deformation estimation by using SAR multifrequency data

Author(s): Giovanni Cuozzo, Melisa Soledad Heredia, Mattia Callegari, Eurac Research (Italy); Fabio Bovenga, Consiglio Nazionale delle Ricerche (Italy); Ludovica De Gregorio, Abraham Mejia-Aguilar, Eurac Research (Italy); Aldo Bertone, Univ. degli Studi di Pavia (Italy); Ilienia Argentiero, Antonella Belmonte, Alberto Refice, Consiglio Nazionale delle Ricerche (Italy); Claudia Notarnicola, Eurac Research (Italy)

6 September 2023 • 14:40 - 15:00 | E105-106

Coffee Break 15:00 - 15:30

SESSION 3: SAR AND RADIOMETRY APPLICATIONS

6 September 2023 • 15:30 - 16:50 | E105-106
Session Chairs: Fabio Bovenga
Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Nazzareno Pierdicca, Sapienza Univ. di Roma (Italy)

12732-10

Applications and level-2 products with the dual-baseline and linear-dual polarimetric MIRANDA35 airborne SAR system

Author(s): Elias Mendez Dominguez, Univ. Zürich (Switzerland); Michael Caris, Fraunhofer-Institut für Hochfrequenzphysik und Radartechnik FHR (Germany); Daniel Henke, Univ. Zürich (Switzerland); Stefan Sieger, Daniel Janssen, Alexander Saam, Fraunhofer-Institut für Hochfrequenzphysik und Radartechnik FHR (Germany); Frederic Bonvin, Peter Wellig, Armasuisse (Switzerland)

6 September 2023 • 15:30 - 15:50 | E105-106

12732-11

Polarimetric holographic SAR 3-D imaging based on L2,1-norm regularization: initial result

Author(s): Jing Feng, Shuang Jin, JingJing Zhang, Hui Bi, Weihao Xu, Jin Xu, Nanjing Univ. of Aeronautics and Astronautics (China)

6 September 2023 • 15:50 - 16:10 | E105-106

12732-12

An improved RFI source detection method based on array factor property for synthetic aperture interferometric radiometer

Author(s): Bincong Liu, Dong Zhu, Fei Hu, Huazhong Univ. of Science and Technology (China)

6 September 2023 • 16:10 - 16:30 | E105-106

12732-13

An interpolation-assisted matrix completion based method for RFI source localization in microwave interferometric radiometry

Author(s): Jiayi Chen, Dong Zhu, Fei Hu, Huazhong Univ. of Science and Technology (China)

6 September 2023 • 16:30 - 16:50 | E105-106

Conference 12733

Image and Signal Processing for Remote Sensing XXIX

4 - 5 September 2023 | E105-106

Conference Chairs: **Lorenzo Bruzzone,** Univ. degli Studi di Trento (Italy); **Francesca Bovolo,** Fondazione Bruno Kessler (Italy)

Conference Co-Chair: **Jon Atli Benediktsson,** Univ. of Iceland (Iceland)

Programme Committee: **Selim Aksoy,** Bilkent Univ. (Turkey); **Luciano Alparone,** Univ. degli Studi di Firenze (Italy); **Abdourrahmane M. Atto,** Univ. Savoie Mont Blanc (France); **Gustavo Camps-Valls,** Univ. de València (Spain); **Jocelyn Chanussot,** Lab. des Images et des Signaux (France); **Chi-Hau Chen,** Univ. of Massachusetts Dartmouth (United States); **B. S. Daya Sagar,** Indian Statistical Institute, Bangalore (India); **Fabio Dell'Acqua,** Univ. degli Studi di Pavia (Italy); **Begüm Demir,** Technische Univ. Berlin (Germany); **Peijun Du,** Nanjing Univ. (China); **Andrea Garzelli,** Univ. degli Studi di Siena (Italy); **Jordi Inglada,** Ctr. d'Etudes Spatiales de la Biosphère (France); **Manolis Koubarakis,** National and Kapodistrian Univ. of Athens (Greece); **Jun Li,** Sun Yat-Sen Univ. (China); **Sicong Liu,** Tongji Univ. (China); **José M. P. Nascimento,** Instituto de Telecomunicações (Portugal); **Claudia Paris,** Univ. degli Studi di Trento (Italy); **Charlotte Pelletier,** Univ. de Bretagne Sud (France); **David Small,** Univ. Zürich (Switzerland); **Florence Tupin,** Télécom ParisTech (France); **Benoit Vozel,** Univ. de Rennes 1 (France); **Josiane B. Zerubia,** INRIA Sophia Antipolis - Méditerranée (France)

MONDAY 4 SEPTEMBER 2023

SESSION 1: PANSHARPENING AND SPATIAL ENHANCEMENT

4 September 2023 • 09:00 - 10:20 | E105-106
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)

12733-1
Full-scale assessment of pansharpening: why literature indexes may give contradictory results and how to avoid such an inconvenience
Author(s): Luciano Alparone, Univ. degli Studi di Firenze (Italy); Andrea Garzelli, Univ. degli Studi di Siena (Italy); Simone Lolli, Istituto di Metodologie per l'Analisi Ambientale (Italy); Claudia Zoppetti, Univ. degli Studi di Siena (Italy)
4 September 2023 • 09:00 - 09:20 | E105-106

12733-2
Super-resolution algorithm of lunar panchromatic image based on random degradation model
Author(s): Lin Lan, DFH satellite Co Ltd. (China); Chunling Lu, DFH satellite Co. Ltd. (China)
4 September 2023 • 09:20 - 09:40 | E105-106

12733-3
Onboard deep learning for efficient small satellite reflectance retrievals and downlink
Author(s): Sarvesh Garimella, ACME AtronOmatic, LLC (United States)
4 September 2023 • 09:40 - 10:00 | E105-106

12733-4
Spatial resolution enhancement of hyperspectral images from miniaturized sensors
Author(s): Sivert Bakken, SINTEF Ocean (Norway); Dennis Langer, Joseph Garrett, Steven Y. Le Moan, Tor Arne Johansen, Norwegian Univ. of Science and Technology (Norway)
4 September 2023 • 10:00 - 10:20 | E105-106

Coffee Break 10:20 - 10:50

SESSION 2: IMAGE PRE-PROCESSING

4 September 2023 • 10:50 - 12:10 | E105-106
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)

12733-5
Super-resolution techniques for Sentinel-5P products
Author(s): Alessia Carbone, Rocco Restaino, Univ. degli Studi di Salerno (Italy); Gemine Vivone, Istituto di Metodologie per l'Analisi Ambientale (Italy), Univ. degli Studi di Salerno (Italy)
4 September 2023 • 10:50 - 11:10 | E105-106

12733-7
Time-efficient intrinsic calibration of an automotive lidar sensor using a tabletop setup to reach subpixel precision
Author(s): Pascal E. Blessing, Jens Hofmann, Robert Bosch GmbH (Germany)
4 September 2023 • 11:10 - 11:30 | E105-106

12733-8
Remote sensing image completion using a diffusion-based propagation algorithm
Author(s): Iain Rolland, Sivasakthy Selvakumaran, Univ. of Cambridge (United Kingdom); Andrea Marinoni, UiT The Arctic Univ. of Norway (Norway), Univ. of Cambridge (United Kingdom)
4 September 2023 • 11:30 - 11:50 | E105-106

12733-9
Improved homographic adaptation for keypoint generation in cross-spectral registration of thermal and optical imagery
Author(s): Ismail Can Yagmur, Hasan F. Ates, Ozyegin Univ. (Turkey)
4 September 2023 • 11:50 - 12:10 | E105-106

Lunch/Exhibition Break 12:10 - 14:00

SESSION 3: CHANGE DETECTION AND DAMAGE ASSESSMENT

4 September 2023 • 14:00 - 15:00 | E105-106
Session Chair: Michael Schmitt,
Univ. der Bundeswehr München (Germany)

12733-11

A theoretical framework for unsupervised land cover change detection in dense satellite image time series
Author(s): Indira Aprilia Listiani, Fondazione Bruno Kessler (Italy), Univ. degli Studi di Trento (Italy); Francesca Bovolo, Massimo Zanetti, Fondazione Bruno Kessler (Italy)
4 September 2023 • 14:00 - 14:20 | E105-106

12733-13

Can we use single image height prediction for sensor-independent change detection?
Author(s): Michael Schmitt, Michael Recla, Univ. der Bundeswehr München (Germany)
4 September 2023 • 14:20 - 14:40 | E105-106

12733-15

Building damage evaluation constructed via attention U-Net based Atrous Spatial Pyramid Pooling through satellite images
Author(s): Chia-Cheng Yeh, National Science and Technology Ctr. for Disaster Reduction (Taiwan); Yang-Lang Chang, National Taipei Univ. of Technology (Taiwan); Tzu-Yin Chang, National Science and Technology Ctr. for Disaster Reduction (Taiwan); Zhong-Liang Lin, Yun-Hsiu Lee, National Taipei Univ. of Technology (Taiwan)
4 September 2023 • 14:40 - 15:00 | E105-106

Coffee Break 15:00 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction
16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*
Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)
4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*
Author(s): Peter Werkhoven, TNO (Netherlands)
4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*
Author(s): Nicolaus Hanowski, ESRIN (Italy)
4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

SESSION 4: DEEP LEARNING FOR IMAGE CLASSIFICATION AND REGRESSION

5 September 2023 • 08:30 - 10:10 | E105-106
Session Chair: Francesca Bovolo, Fondazione Bruno Kessler (Italy)

12733-16

A class-driven hierarchical ResNet for classification of multispectral remote sensing images
Author(s): Giulio Weikmann, Gianmarco Perantoni, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)
5 September 2023 • 08:30 - 08:50 | E105-106

12733-17

Large-scale LOD1 building extraction from a textured 3D mesh of a scene
Author(s): Liuyun Duan, Michael Swaine, Sebastien Tripodi, Mohamed Abderrazak Cherif, Arno Gobbin, Nicolas Girard, Yuliya Tarabalka, Lionel Laurore, LuxCarta (France)
5 September 2023 • 08:50 - 09:10 | E105-106

12733-18

Enhancing land cover maps with optical time series and ambiguous loss function
Author(s): Alistair Francis, Michael Marszalek, James Wheeler, European Space Agency (Italy); Caglar Senaras, Planet Labs (Netherlands); Timothy Davis, Annett Wania, Planet Labs Germany GmbH (Germany)
5 September 2023 • 09:10 - 09:30 | E105-106

12733-19

Deep learning methodologies for chemical dispersion map reconstruction
Author(s): Luca Martellucci, Alessandro Puleio, Riccardo Rossi, Novella Rutigliano, Pasqualino Gaudio, Univ. degli Studi di Roma "Tor Vergata" (Italy)
5 September 2023 • 09:30 - 09:50 | E105-106

12733-20

A deep multiple instance learning approach based on coarse labels for high-resolution land-cover mapping
Author(s): Gianmarco Perantoni, Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)
5 September 2023 • 09:50 - 10:10 | E105-106

Coffee Break 10:10 - 10:40

SESSION 5: OBJECT DETECTION AND UNMIXING

5 September 2023 • 10:40 - 12:00 | E105-106
Session Chair: Francesca Bovolo, Fondazione Bruno Kessler (Italy)

12733-21

Automated method for generating datasets of infrared or visible images for context-specific training of deep neural network-based object detectors
Author(s): Alexander Pichler, Nicolas Hueber, Institut Franco-Allemand de Recherches de Saint-Louis (France)
5 September 2023 • 10:40 - 11:00 | E105-106

12733-22

Improve target detection on hyperspectral aerial images using simulated atmosphere conditions
Author(s): Rosario Di Carlo, Roberto Morelli, Alessandro Nicolosi, Leonardo (Italy)
5 September 2023 • 11:00 - 11:20 | E105-106

12733-23
Spatial information extraction of oil well sites based on medium-resolution satellite imagery
Author(s): Hao Wu, Northeast Petroleum Univ. (China); Hongli Dong, Artificial Intelligence Energy Research Institute (China), Northeast Petroleum Univ. (China); Zhibao Wang, Northeast Petroleum Univ. (China); Lu Bai, Univ. of Ulster (United Kingdom); Fengcai Huo, Artificial Intelligence Energy Research Institute (China), Northeast Petroleum Univ. (China); Jinhua Tao, Liangfu Chen, State Key Lab. of Remote Sensing Science (China), Univ. of Chinese Academy of Sciences (China)
5 September 2023 • 11:20 - 11:40 | E105-106

12733-24
Moving ship detection of satellite video based on a weakly supervised detector
Author(s): Zhuang Zhou, Shengyang Li, Xuan Li, Yunziwei Deng, Technology and Engineering Ctr. for Space Utilization (China)
5 September 2023 • 11:40 - 12:00 | E105-106

Lunch/Exhibition Break 12:00 - 13:50

SESSION 6: ACCURACY ASSESSMENT AND BIG DATA ANALYSIS
5 September 2023 • 13:50 - 15:30 | E105-106
Session Chair: Claudia Zoppetti, Univ. degli Studi di Siena (Italy)

12733-26
Accuracy assessment of land-use-land-cover maps: the semantic gap between in situ and satellite data
Author(s): Claudia Paris, Univ. Twente (Netherlands); Laura Martinez-Sanchez, Marijn van der Velde, European Commission Joint Research Ctr. (Italy); Surbhi Sharma, Rocco Sedona, Gabriele Cavallaro, Forschungszentrum Jülich GmbH (Germany)
5 September 2023 • 13:50 - 14:10 | E105-106

12733-27
Linking Earth observation data with ground truth from the open web
Author(s): Geert Koster, Cornelis Valk, NEO B.V. (Netherlands); Ioannis Athanasiadis, Wageningen Univ. & Research (Netherlands)
5 September 2023 • 14:10 - 14:30 | E105-106

12733-28
Multi-year monitoring of wheat phenology and effect of climate change in the south Asian region using Sentinel-2 NDVI time series analysis
Author(s): Vaneeza Mehmood, Asad Imtiaz Malik, Zuhair Zafar, National Univ. of Sciences and Technology (Pakistan); Muhammad Shahzad, Technische Univ. München (Germany); Karsten Berns, Rheinland-Pfälzische Technische Univ. Kaiserslautern-Landau (Germany); Muhammad Moazam Fraz, National Univ. of Sciences and Technology (Pakistan)
5 September 2023 • 14:30 - 14:50 | E105-106

12733-29
A GPU-accelerated algorithm for copy move detection in large-scale satellite images
Author(s): Mauro Barni, Andrea Costanzo, Giovanna Maria Dimitri, Benedetta Tondi, Univ. degli Studi di Siena (Italy)
5 September 2023 • 14:50 - 15:10 | E105-106

12733-30
A convolutional neural network approach to the detection of LC transitions in multi-annual satellite image time series
Author(s): Khatereh Meshkini, Fondazione Bruno Kessler (Italy), Univ. degli Studi di Trento (Italy); Francesca Bovolo, Fondazione Bruno Kessler (Italy); Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)
5 September 2023 • 15:10 - 15:30 | E105-106

Coffee Break 15:30 - 16:00

SESSION 7: SAR AND RADAR DATA ANALYSIS
5 September 2023 • 16:00 - 17:00 | E105-106
Session Chair: Lorenzo Bruzzone, Univ. degli Studi di Trento (Italy)

12733-31
Ground based SAR system for object classification with parameter optimization based on deep learning feedback algorithm
Author(s): Filip Turcinovic, Marin Kačan, Dario Bojanjac, Marko Bosiljevac, Univ. of Zagreb (Croatia)
5 September 2023 • 16:00 - 16:20 | E105-106

12733-32
Convolutional deep learning network for InSAR phase denoising and unwrapping
Author(s): Asma Fejjari, Gianluca Valentino, Johann A. Briffa, Reuben A. Farrugia, Univ. of Malta (Malta)
5 September 2023 • 16:20 - 16:40 | E105-106

12733-33
Maritime ship tracking based on SAR constellation: a preliminary implementation
Author(s): Haitao Lang, Lihui Niu, Jialu Li, Wenjing Li, Beijing Univ. of Chemical Technology (China); Li Ma, Three Gorges Corporation (China)
5 September 2023 • 16:40 - 17:00 | E105-106

POSTERS-TUESDAY
5 September 2023 • 17:15 - 19:00 | Elicium Hall
Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs
View poster presentation guidelines and set-up instructions at
https://spie.org/ESI/poster-presentation-guidelines

12733-35
Sparse SAR target classification based on transfer learning
Author(s): Hui Bi, Zehao Liu, Jingjing Zhang, Jiarui Deng, Zhongyuan Ji, Nanjing Univ. of Aeronautics and Astronautics (China)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-36
Spatio temporal fusion with ESTARFM and residual compensation using Sentinel-2 data to create high-resolution satellite image
Author(s): Geunah Kim, Yangwon Lee, Pukyong National Univ. (Republic of Korea)
5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12733

12733-37

A study on the impact of the spatial and spectral resolution on plant species richness in Mediterranean regions using optical remote sensing data

Author(s): Ama Serwah Boakye, Margarita Huesca Martinez, Claudia Paris, Univ. Twente (Netherlands)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-38

Image restoration using deep learning

Author(s): Rikita Chokshi, Charotar Univ. of Science and Technology (CHARUSAT) (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-39

Semi-supervised hyperspectral unmixing dataset creation methods for unmixing algorithm analysis

Author(s): Vytautas Paura, Virginijus Marcinkevičius, Vilnius Univ. (Lithuania)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-40

Application of generative adversarial network: GAN to disaster damage monitoring

Author(s): Yushin Nakaoka, Kohei Arai, Osamu Fukuda, Nobuhiko Yamaguchi, Wen Liang Yeoh, Hiroshi Okumura, Saga Univ. (Japan)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-41

Implementation of the RX algorithm in TensorFlow for high-performance computing

Author(s): Ravinder Dhanday, Joel Pearson, Christopher Willis, BAE Systems (United Kingdom)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-42

Monitoring of renewable energy sources with remote sensing, open data and field data in Bulgaria

Author(s): Temenuzhka Spasova, Daniela Avetisyan, Adlin Dancheva, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-43

Detection of over-ground petroleum and gas pipelines from optical remote sensing images

Author(s): Huan Chang, Northeast Petroleum Univ. (China); Lu Bai, Univ. of Ulster (United Kingdom); Zhibao Wang, Mei Wang, Northeast Petroleum Univ. (China); Ying Zhang, Jinhua Tao, Liangfu Chen, State Key Lab. of Remote Sensing Science (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-44

KhalifaSat super-resolution technique: improving spatial resolution of satellite imagery using convolutional neural networks and sub-pixel CNN

Author(s): Alavikunhu Panthakkan, Univ. of Dubai (United Arab Emirates)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-45

A remote sensing satellite image compression method based on conditional generative adversarial network

Author(s): Kan Cheng, Yafang Zou, Yuting Zhao, Hao Jin, Chengchao Li, China Academy of Space Technology (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-46

Landslide susceptibility studies in Uttarakhand using novel machine learning-based model

Author(s): Ashok Anand, Arya Prakash Padhi, Alok Bhardwaj, Indian Institute of Technology Roorkee (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12733-47

Image restoration techniques for space-based lightweight optically sparse aperture Earth-observation telescopes in the longwave infrared domain

Author(s): Avyarthana Ghosh, Pavan Reddy, Achanna Anil Kumar, Balamuralidhar Purushothaman, Arpan Pal, Tata Consultancy Services, Ltd. (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12734

Earth Resources and Environmental Remote Sensing/GIS Applications XIV

3 - 6 September 2023 | D201

Conference Chair: **Karsten Schulz,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Ulrich Michel,** ROSEN Technology and Research Ctr. GmbH (Germany); **Konstantinos G. Nikolakopoulos,** Univ. of Patras (Greece)

Programme Committee: **Maria Libera Battagliere,** Agenzia Spaziale Italiana (Italy); Program Committee: **Markus Boldt,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Dimitri Bulatov,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Valerio Gagliardi,** Univ. degli Studi di Roma Tre (Italy); **Pierre Karrasch,** TU Dresden (Germany); **Pablo H. Rosso,** Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V. (Germany); **Ana Claudia Moreira Teodoro,** Univ. do Porto (Portugal); **Kyriacos Themistocleous,** Cyprus Univ. of Technology (Cyprus); **Christine Wessollek,** TU Dresden (Germany)

SUNDAY 3 SEPTEMBER 2023

SESSION 1: ENVIRONMENTAL MONITORING CONCEPTS I

3 September 2023 • 13:40 - 15:00 | D201
Session Chairs: Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Ulrich Michel, ROSEN Technology and Research Ctr. GmbH (Germany)

12734-1
Detection and automatic extraction of the coastline of Libreville (Gabon) using machine learning and convolutional neural network methods
Author(s): Nina Manomba-Mbadinga, Littoral, Environnement, Télédétection, Géomatique (France); Simona Niculescu, Narimane Zaabar, Guanyao Xie, Littoral, Environnement, Télédétection, Géomatique (France); Jean-Bernard Mombo, Univ. Omar Bongo (Gabon)
3 September 2023 • 13:40 - 14:00 | D201

12734-3
The CAMS reanalysis PM2.5 product representing PM2.5 trend over Chonburi Province Thailand
Author(s): Pramet Kaewmesri, Nuntikorn Kitratporn, Jiratiwan Kruasilp, Phukrit Sriwilas, Chanika Sukawattanavijit, Geo-Informatics and Space Technology Development Agency (Thailand)
3 September 2023 • 14:00 - 14:20 | D201

12734-4
How precisely can we map blue ice in Antarctica?
Author(s): Shridhar D. Jawak, Svalbard Integrated Arctic Earth Observing System (Norway); Sagar F. Wankhede, Manipal Institute of Technology, Manipal Academy of Higher Education (India); Alvarinho J. Luis, National Ctr. for Antarctic & Ocean Research (India); Prashant H. Pandit, Univ. degli Studi di Trento (Italy), Istituto per l'osservazione della Terra, Eurac Research (Italy); Peter Convey, Peter T. Fretwell, British Antarctic Survey (United Kingdom)
3 September 2023 • 14:20 - 14:40 | D201

12734-5
Progressive monitoring of microdumps: a case study over the Campania Region (Italy)
Author(s): Luca Cicala, Francesco Gargiulo, Sara Parrilli, Donato Amitrano, Gianpaolo Pigliasco, Ctr. Italiano Ricerche Aerospaziali (Italy)
3 September 2023 • 14:40 - 15:00 | D201

Coffee Break 15:00 - 15:30

SESSION 2: ENVIRONMENTAL MONITORING CONCEPTS II

3 September 2023 • 15:30 - 16:50 | D201
Session Chairs: Ulrich Michel, ROSEN Technology and Research Ctr. GmbH (Germany), Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12734-6
Detection and characterization of coastal wetlands of peninsula of Crozon (Brittany, France) at sub-metric scale by machine and deep learning methods
Author(s): Adrien Le Guillou, Simona Niculescu, Univ. de Bretagne Occidentale (France); Christiane Schmullius, Friedrich-Schiller-Univ. Jena (Germany)
3 September 2023 • 15:30 - 15:50 | D201

12734-7
A novel algorithm for retrieval of chlorophyll a in turbid waters using deep learning
Author(s): Donglin Fan, Hongchang He, Tianlong Liang, Guilin Univ. of Technology (China)
3 September 2023 • 15:50 - 16:10 | D201

12734-8
Machine learning for integrated field and remote sensing data for tropical forest and trees-outside-forest (TOF) resources inventory
Author(s): Bashir Adamu, Modibbo Adama Univ. of Technology, Yola (Nigeria); Abdurrahman Ismaila, Modibbo Adama Univ. of Technology, Yola (Nigeria); Ibrahim Muhammed, Modibbo Adama Univ. of Technology, Yola (Nigeria)
3 September 2023 • 16:10 - 16:30 | D201

12734-9
Mapping of pollution due to stubble burning, its impacts and management practices
Author(s): Nisha Choudhary, Forest Research Institute (India)
3 September 2023 • 16:30 - 16:50 | D201

MONDAY 4 SEPTEMBER 2023

SESSION 3: SENSORS AND PLATFORMS

4 September 2023 • 09:00 - 9:40 | D201
Session Chairs: Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece), Ana Claudia Moreira Teodoro, Univ. do Porto (Portugal)

12734-10
Monitoring ship emissions using Sentinel-5P and AIS data
Author(s): Astrid A. Werkmeister, Univ. of Strathclyde (United Kingdom); Andrew Carrel, Netan Porwal, AAC Clyde Space Ltd. (United Kingdom); Carmine Clemente, Malcolm Macdonald, Univ. of Strathclyde (United Kingdom)
4 September 2023 • 09:00 - 09:20 | D201

12734-13
Quantifying canopy nitrogen content from space-based hyperspectral sensor PRISMA
Author(s): Koyel Sur, Punjab Remote Sensing Ctr. (India); Shubham Awasthi, Ctr. of Excellence in Disaster Mitigation and Management, Indian Institute of Technology Roorkee (India)
4 September 2023 • 09:20 - 9:40 | D201

SESSION 4: REMOTE SENSING FOR ARCHAEOLOGY, PRESERVATION OF CULTURAL AND NATURAL HERITAGE

4 September 2023 • 09:40 - 10:00 CEST | D201
Session Chairs: Aggeliki Kyriou, Univ. of Patras (Greece), Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

12734-25
Generation of high quality 3D models of a monastery located in Western Greece
Author(s): Aggeliki Kyriou, Theodora Filippa, Christoforos Pappas, Konstantinos G. Nikolakopoulos, Ioannis Koukouvelas, Univ. of Patras (Greece)
4 September 2023 • 09:40 - 10:00 | D201

Coffee Break 10:00 - 10:30

SESSION 5: INFRASTRUCTURES AND URBAN AREAS

4 September 2023 • 10:30 - 11:40 | D201
Session Chairs: Markus Boldt, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12734-14
Outcomes of continuous monitoring of crucial infrastructure in the framework of "PROION" project
(Invited Paper)
Author(s): Konstantinos G. Nikolakopoulos, Aggeliki Kyriou, Efthimios Sokos, Stathis Bousias, Elias Strepelias, Peter Groumpos, Vassiliki Mpelogianni, Zafeiria Roumelioti, Anna Serpetsidaki, Dimitrios Paliatsas, Panagiotis Stefanopoulos, Univ. of Patras (Greece); Athanassios Ganas, National Observatory of Athens (Greece); Vassiliki Charalampopoulou, Geosystems Hellas S.A. (Greece); Theodoros Athanasopoulos, ES Systems (Greece)
4 September 2023 • 10:30 - 11:00 | D201

12734-15
Analysis of the urban heat island in Bragança, Portugal, using MODIS data (2003-2022)
Author(s): Cátia Almeida, Univ. do Porto (Portugal), Instituto de Ciencias de la Tierra (Portugal); João Alírio, Univ. do Porto (Portugal); Artur Gonçalves, Ctr. de Investigação de Montanha, Instituto Politécnico de Bragança (Portugal), Lab. Associado para a Sustentabilidade e Tecnologia em Regiões de Montanha (Portugal); Ana Cláudia M. Teodoro, Univ. do Porto (Portugal), Instituto de Ciencias de la Tierra (Portugal)
4 September 2023 • 11:00 - 11:20 | D201

12734-16
CNN-based track detection in coherent SAR imagery: a distinction between foot and vehicle tracks
Author(s): Silvia Kuny, Horst Hammer, Antje Thiele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
4 September 2023 • 11:20 - 11:40 | D201

Lunch/Exhibition Break 11:40 - 13:20

SESSION 6: PROCESSING METHODOLOGIES

4 September 2023 • 13:20 - 15:00 | D201
Session Chairs: Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece), Ana Claudia Moreira Teodoro, Univ. do Porto (Portugal)

12734-18
Assessing the potential of machine learning and integrated satellite data for canopy height mapping: a case study on the Iberian Peninsula
Author(s): Gonzalo Otón, Samuele Capobianco, Marco Girardello, Guido Ceccherini, Mark Pickering, Agata Elia, Mirco Migliavacca, Alessandro Cescatti, European Commission Joint Research Ctr. (Italy)
4 September 2023 • 13:20 - 13:40 | D201

12734-20
Disaster impact analysis in Africa: EDDA - UAV building damage dataset of rural and urban Mozambique
Author(s): Damjan Hatic, Markus Rauhut, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany); Vladyslav Polushko, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany), Darmstadt University of Applied Sciences (Germany); Marco Codastefano, Sophia Rosa, Patrick McKay, Francesco Stompanato, WFP Mozambique CO (Mozambique); Antonio Beleza, INGD (Mozambique); Hans Hagen, Rheinland-Pfälzische Technische Univ. Kaiserslautern-Landau (Germany)
4 September 2023 • 13:40 - 14:00 | D201

12734-21
Developing early warning systems for land degradation around refugee camps: a preliminary approach
Author(s): Malgorzata Jenerowicz-Sanikowska, Space Research Ctr. of the Polish Academy of Sciences (Poland); Cristina Domingo-Marimon, Lluís Pesquer Mayos, GRUMETS Research Group, Consorci Ctr. de Recerca Ecològica i Aplicacions Forestals (Spain); Edyta Woźniak, Marek Rucinski, Anna Foks-Ryznar, Michal Krupiński, Sebastian Aleksandrowicz, Space Research Ctr. of the Polish Academy of Sciences (Poland); Magdalena Chułek, Karolina Sobczak-Szelc, Ctr. of Migration Research Univ. of Warsaw (Poland); Astrid Espegren, Jörg Haarpaintner, NORCE Norwegian Research Ctr. AS (Norway); Daniel Starczewski, UNEP/GRID-Warsaw Ctr. (Poland)
4 September 2023 • 14:00 - 14:20 | D201

12734-22

Development of spectral characteristics of contaminated snow in Himalayan region

Author(s): Vivek Balla, Pradeep Kumar Garg, Indian Institute of Technology Roorkee (India)

4 September 2023 • 14:20 - 15:00 | D201

12734-23

Delineating socio-ecological system using the remote sensing approach in the Indian Eastern Himalayan region

Author(s): Merensangla Longkumer, Tara Chand, Rajiv Pandey, Forest Research Institute (India)

4 September 2023 • 14:30 - 14:50 | D201

EARTH RESOURCES AND ENVIRONMENTAL REMOTE SENSING CONFERENCE:
FUTURE DIRECTION AND STRATEGY

4 September 2023 • 15:00 - 15:30 | D201

Discussion session on future topics. special sessions, and focus of the Earth Resources and Environmental Remote Sensing/GIS Applications Conference.

Moderators:

Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Ulrich Michel, ROSEN Technology and Research Ctr. GmbH (Germany)

Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

Coffee Break 15:00 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

SESSION 7: SATELLITE RS AND GROUND-BASED NONDESTRUCTIVE TECHNOLOGIES IN CIVIL AND ENVIRONMENTAL ENGINEERING I

5 September 2023 • 10:30 - 12:10 | D201

Session Chairs: Valerio Gagliardi, Univ. degli Studi di Roma Tre (Italy), Luigi D'Amato, Agenzia Spaziale Italiana (Italy)

12734-28

Pilot projects for infrastructure and environmental monitoring from space: a challenge for public and private stakeholders

Author(s): Luigi D'Amato, Maria Libera Battagliere, Laura Candela, Alessandro Coletta, Italian Space Agency (Italy)

5 September 2023 • 10:30 - 10:50 | D201

12734-29

Satellite remote sensing for transport infrastructure monitoring at the land-sea interface

Author(s): Valerio Gagliardi, Antonio Napolitano, Univ. degli Studi di Roma Tre (Italy); Tesfaye T. Tessema, Fabio Tosti, Univ. of West London (United Kingdom); Andrea Benedetto, Univ. degli Studi di Roma Tre (Italy)

5 September 2023 • 10:50 - 11:10 | D201

12734-30

Survey of airport facilities: novel approaches

Author(s): Luca Bertolini, Luca Bianchini Ciampoli, Ruggero Pinto, Andrea Benedetto, Univ. degli Studi di Roma Tre (Italy)

5 September 2023 • 11:10 - 11:30 | D201

12734-31

Radiation characteristics of a metamaterial coated axially slotted cylinder buried below a rough surface

Author(s): Tayyab H. Malik, CASHT-Ctr. of Advanced Studies in Health & Technology, Rawalpindi (Pakistan)

5 September 2023 • 11:30 - 11:50 | D201

12734-17

Estimation of tree height using radar remote sensing in urban setting: a preliminary result

Author(s): Tesfaye T. Tessema, Stephen Uzor, Univ. of West London (United Kingdom); Dale Mortimer, London Borough of Ealing (United Kingdom); Fabio Tosti, Univ. of West London (United Kingdom)

5 September 2023 • 11:50 - 12:10 | D201

Lunch/Exhibition Break 12:10 - 13:30

SESSION 8: SATELLITE RS AND GROUND-BASED NONDESTRUCTIVE TECHNOLOGIES IN CIVIL AND ENVIRONMENTAL ENGINEERING II

5 September 2023 • 13:30 - 15:10 | D201

Session Chairs: Luigi D'Amato, Agenzia Spaziale Italiana (Italy), Valerio Gagliardi, Univ. degli Studi di Roma Tre (Italy)

12734-32

InSAR for depth estimation of pavements: a feasibility study

Author(s): Tesfaye T. Tessema, Univ. of West London (United Kingdom); Valerio Gagliardi, Luca Bianchini Ciampoli, Univ. degli Studi di Roma Tre (Italy); Fabio Tosti, Univ. of West London (United Kingdom)

5 September 2023 • 13:30 - 13:50 | D201

12734-33

Dynamic stiffness analysis of asphalt mixtures for nondestructive pavement performance assessment

Author(s): Freddy Richard Apaza Apaza, Univ. Politécnica de Madrid (Spain); Victoriano Vázquez Fernandez, Santiago E. Paje, Univ. de Castilla-La Mancha (Spain); Federico Gulisano, Gustavo Boada, Juan Gallego, Univ. Politécnica de Madrid (Spain)

5 September 2023 • 13:50 - 14:10 | D201

12734-34

Non-destructive testing methods for road pavement health monitoring: electromechanical assessment of self-sensing asphalt materials

Author(s): Federico Gulisano, Freddy Richard Apaza Apaza, Univ. Politécnica de Madrid (Spain); Daniel Gálvez-Pérez, Universidad Politécnica de Madrid (Spain); Rafael Jurado-Piña, Gustavo Boada-Parra, Juan Gallego, Univ. Politécnica de Madrid (Spain)

5 September 2023 • 14:10 - 14:30 | D201

12734-35

Deep neural networks for asphalt pavement distress detection and condition assessment

Author(s): Valerio Gagliardi, Bruno Giammorcaro, Bella Francesco, Giuseppe Sansonetti, Univ. degli Studi di Roma Tre (Italy)

5 September 2023 • 14:30 - 14:50 | D201

12734-36

Characterization of interlayer bonding mechanism based on interface morphology between asphalt mix and electronics devices covers materials

Author(s): Luis Gustavo Boada-Parra, Freddy Apaza, Federico Gulisano, Juan Gallego, Rafael Jurado-Piña, Univ. Politécnica de Madrid (Spain)

5 September 2023 • 14:50 - 15:10 | D201

Coffee Break 15:10 - 15:40

SESSION 9: HAZARD MITIGATION GEOLOGIC APPLICATIONS

5 September 2023 • 15:40 - 17:20 | D201
Session Chairs: Ana Claudia Moreira Teodoro, Univ. do Porto (Portugal), Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

12734-37

Mapping NYF pegmatite outcrops through high-resolution Worldview-3 imagery

Author(s): Douglas Santos, Ariane Mendes, Antonio Azzalini, Joana Cardoso-Fernandes, Alexandre Lima, Ana Cláudia M. Teodoro, Univ. do Porto (Portugal)

5 September 2023 • 15:40 - 16:00 | D201

12734-38

Analysis of surface deformation during volcanic eruptions using Sentinel-1 imagery

Author(s): Aggeliki Kyriou, Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

5 September 2023 • 16:00 - 16:20 | D201

12734-39

Sentinel data for critical raw materials (CRM) exploration: first results of the S34I project

Author(s): Joana Cardoso-Fernandes, Univ. do Porto (Portugal), Instituto de Ciencias de la Tierra (Portugal); Morgana Carvalho, Antonio Azzalini, Gonçalo Rodrigues, Gonçalo Monteiro, Univ. do Porto (Portugal); Alexandre Lima, Ana Cláudia M. Teodoro, Univ. do Porto (Portugal), Instituto de Ciencias de la Tierra (Portugal)

5 September 2023 • 16:20 - 16:40 | D201

12734-40

UAV photogrammetry and in situ measurements for mass wasting monitoring in a steep cliff

Author(s): Ioannis Koukouvelas, Georgios Pappas, Aggeliki Kyriou, Dionysios Apostolopoulos, Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

5 September 2023 • 16:40 - 17:00 | D201

12734-2

Examining the correlation of remote sensing burn severity indices with the composite burn index method along with natural and anthropogenic features and fire frequency to analyze their impact on potential vegetation recovery: the case of the Varibobi wildfire in Athens/Greece

Author(s): Emmanouil Psomiadis, Emmanouela Zevgoli, Agricultural Univ. of Athens (Greece); Marilou Avramidou, Agricultural Univ. of Athens (Greece); Dimitra Veropoulou, Agricultural Univ. of Athens (Greece); Simoni Alexiou, Agricultural Univ. of Athens (Greece); Petros Mecaj, Agricultural Univ. of Athens (Greece)

5 September 2023 • 17:00 - 17:20 | D201

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12734-43

Mapping of prosopis invasion using Sentinel-2 imagery in Thoothukudi, Tamil Nadu, India

Author(s): Monika Singh, Institute of Forest Genetics and Tree Breeding (India); Anuja Hiregoudar, ICFRE-Institute of Forest Genetics and Tree Breeding (India); Amaladas Pushparaj, Rajasekaran Arunachalam, Institute of Forest Genetics and Tree Breeding (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-44

GEMS observation and operation for air quality monitoring over Asia

Author(s): Jaehoon Jeong, Goo Kim, Kyunghwa Lee, Dongwon Lee, Kyung-Jung Moon, National Institute of Environmental Research (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-45

MontObEO, Montesinho biodiversity observatory: an Earth observation tool for biodiversity conservation

Author(s): Nuno Garcia, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal); João Alírio, Univ. do Porto (Portugal); Daniel Silva, João Campos, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal); Lia Duarte, Univ. do Porto (Portugal); Salvador Arenas-Castro, Univ. de Córdoba (Spain); Isabel Pôças, ForestWISE (Portugal); Neftali Sillero, Ctr. de Investigação em Ciências Geo-Espaciais (Portugal); Ana Cláudia M. Teodoro, Univ. do Porto (Portugal)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-46

A GIS open source application for cost distance modelling for site catchment analysis of prehistoric sites

Author(s): Lia Duarte, Sofia Godinho, Alberto Gomes, Sérgio Rodrigues, Ana Cláudia M. Teodoro, Univ. do Porto (Portugal)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-47

A new indicator for enhancing fire fuel mapping in Marivan forests, west of Iran

Author(s): Iraj Rahimi, Lia Duarte, Ana Cláudia M. Teodoro, Univ. do Porto (Portugal)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-48

Automated lineament extraction applied to high-resolution imagery Worldview-3 and LiDAR data for pegmatite mineral exploration

Author(s): Douglas Santos, Ariane Mendes, Antonio Azzalini, Joana Cardoso-Fernandes, Alexandre Lima, Ana Cláudia M. Teodoro, Univ. do Porto (Portugal)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-49

Effects of climate change and urbanization on vegetation phenology in Bucharest metropolitan area

Author(s): Maria A. Zoran, Roxana S. Savastru, Dan M. Savastru, Marina N. Tautan, Daniel V. Tenciu, National Institute of Research and Development for Optoelectronics (Romania); Adrian C. Penache, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-50

A web GIS platform for critical infrastructure monitoring within "PROION" project

Author(s): Efthymios Magkoufis, Stavros Chlorokostas, Lydia Valdesera, Geosystems Hellas S.A. (Greece); Aggeliki Kyriou, Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-51

Mapping ground deformation in Turkey after earthquake using SAR imagery

Author(s): Aggelos Kalafatis, Aggeliki Kyriou, Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-52

Quantitative comparison of temporal changes in coastline utilizing Google Earth, Landsat and Sentinel-2 historical time series case study: the Mytikas coast, Aitoloakarnania Prefecture, Greece

Author(s): Vasiliki Verrou, Dionysios Apostolopoulos, Konstantinos G. Nikolakopoulos, Univ. of Patras (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-53

Exploring the spatiotemporal patterns of precipitation and vegetation: an example from the Mediterranean, Crete, Greece

Author(s): Dimitrios D. Alexakis, Manolis Grillakis, Stelios Manoudakis, Foundation for Research and Technology-Hellas (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-54

Modeling post-fire forest regrowth using tasseled cap-derived indicators

Author(s): Nataliya Stankova, Daniela Avetisyan, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-55

Status and plan for GEMS data generation and distribution

Author(s): Goo Kim, Kyunghwa Lee, Jaehoon Jeong, National Institute of Environmental Research (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-56

Trends in ground filtering of airborne lidar data: a comparison of the most used algorithms at different NEON field sites

Author(s): Aaron Cardenas-Martinez, Francisco M. Canero, Emilia Guisado-Pintado, Victor Rodriguez-Galiano, Univ. de Sevilla (Spain)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-57

Mission analysis of hyperspectral nanosatellite for mining resource exploration

Author(s): Imène Taleb, Mohammed Yassine Ghaffour, Agence Spatiale Algérienne (Algeria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-58

Mapping of climate change hotspots in Indian forests

Author(s): Tanu Priya Tanwar, Forest Research Institute (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-59

Topographic effects in the downscaling of downwelling shortwave radiation

Author(s): Sergio Sánchez-Ruiz, Manuel Campos-Taberner, Beatriz Martínez, Francisco Javier García Haro, María Amparo Gilabert, Univ. de València (Spain)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-60

Characterizing land deformations in Western Greece with satellite remote sensing observations and in situ ground monitoring

Author(s): Konstantinos Fasoulis, Panagiotis Triantafyllidis, Panagiotis Hadjidoukas, Christoforos Pappas, Univ. of Patras (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-61

Modulating spectral reflectance and its impact on thematic mapping: an analysis on glacier facies using very high-resolution satellite imagery

Author(s): Sagar F. Wankhede, Manipal Institute of Technology (India); Prashant H. Pandit, Univ. degli Studi di Trento (Italy), Istituto per l'osservazione della Terra, Eurac Research (Italy); Shridhar D. Jawak, Svalbard Integrated Arctic Earth Observing System (Norway); Alvarinho J. Luis, National Ctr. for Antarctic & Ocean Research (India); Keshava Balakrishna, Manipal Institute of Technology, Manipal Academy of Higher Education (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-62

Compensation of linear distortions in case of transmitting measurement information

Author(s): Galina Cherneva, South-West Univ. "Neofit Rilski" (Bulgaria), Todor Kableshkov Univ. of Transport (Bulgaria); Valentina Hristova, Todor Kableshkov Univ. of Transport (Bulgaria), Space Research and Technology Institute (Bulgaria); Denitsa Borisova, Anna Bouzekova-Penkova, Daniela Avetisyan, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-63

Assessment of the effect of UAV and Pleiades spatial resolution and band combination on biomass estimation in Haagse bos, the Netherlands

Author(s): Misheck L. Chundu, Univ. of Zambia (Zambia), Ministry of Agriculture, Zambia (Zambia); Louise van Leeuwen, Univ. Twente (Netherlands)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-64

Satellite monitoring of sea ice dynamics at local scale

Author(s): Michal Krupiński, Edyta Woźniak, Marek Rucinski, Wlodek Kofman, Anna Wawrzaszek, Space Research Ctr. of the Polish Academy of Sciences (Poland); Alice Baronetti, Gianna Vivaldo, Antonello Provenzale, Mariasilvia Giamberini, Consiglio Nazionale delle Ricerche (Italy)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-65

Monitoring and spatial distribution of lava and volcanic eruptions from Cumbre Vieja ridge on island La Palma in the Canary Islands occured in 2021 by methods of remote sensing

Author(s): Andrey Stoyanov, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12734-66

Dead Sea recession monitoring by using remote sensing

Author(s): Entisar Elhihi, Royal Jordanian Geographic Ctr. (Jordan)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12735

Remote Sensing Technologies and Applications in Urban Environments VIII

3 - 4 September 2023 | E103

Conference Chairs: **Thilo Erbertseder,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Nektarios Chrysoulakis,** Foundation for Research and Technology-Hellas (Greece); **Ying Zhang,** Natural Resources Canada (Canada)

Programme Committee: **Matthias Budde,** Karlsruhe Institute of Technology (Germany); **Thomas Esch,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Lorenza Gilardi,** Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); **Zina Mitraka,** Foundation for Research and Technology-Hellas (Greece); **Christopher Small,** The Earth Institute (United States); **Carlos Tavares Calafate,** Univ. Politécnica de Valencia (Spain)

SUNDAY 3 SEPTEMBER 2023

SESSION 1: URBAN PLANNING

3 September 2023 • 13:40 - 15:00 | E103
Session Chair: Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

12735-2
Super-resolution enhancement of satellite imagery and application in urban environments
Author(s): Hossein H. Arefi, Seyd Teymoor Seydi, Mainz Univ. of Applied Sciences (Germany)
3 September 2023 • 13:40 - 14:00 | E103

12735-3
Ecological pattern evolution of land use change in Beijing-Tianjin-Hebei capital urban agglomeration, China
Author(s): Xu Zhang, Josep Roca Cladera, Blanca Arellano Ramos, Univ. Politècnica de Catalunya (Spain)
3 September 2023 • 14:00 - 14:00 | E103

12735-4
Estimating change in the spatial economy of the city of Johannesburg using nighttime lights imagery and population data in a Random Forest modelling environment
Author(s): Yashena Naidoo, Gillian Maree, Laven Naidoo, Gauteng City-Region Observatory (South Africa)
3 September 2023 • 14:00 - 14:40 | E103

12735-6
Identifying spatial attributes of LULC classes affecting urban area LST in districts of India
Author(s): Ravi Verma, P.K. Garg, Indian Institute of Technology Roorkee (India)
3 September 2023 • 14:40 - 15:00 | E103

Coffee Break 15:00 - 15:30

SESSION 2: SMART CITIES

3 September 2023 • 15:30 - 16:30 | E103
Session Chair: Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece)

12735-7
Mapping electrical towers in satellite imagery with smart-tracing
Author(s): Fiona Gallagher, Laurens Hagendoorn, Geert Koster, Fang Fang, Cornelis Valk, NEO B.V. (Netherlands)
3 September 2023 • 15:30 - 15:50 | E103

12735-9
Advancing road safety assessment with digital holography: a study on skid resistance of asphalt pavements
Author(s): Davood Khodadad, Umeå Univ. (Sweden)
3 September 2023 • 15:50 - 16:10 | E103

12735-11
Image pre-processing and shadow detection for building extraction from high-resolution satellite images
Author(s): Dolonchapa Prabhakar, Pradeep Kumar Garg, Indian Institute of Technology Roorkee (India)
3 September 2023 • 16:10 - 16:30 | E103

MONDAYA 4 SEPTEMBER 2023

SESSION 3: URBAN AIR QUALITY I

4 September 2023 • 09:20 - 10:20 | E103
Session Chair: Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

12735-12
Compact NO2 plume detection instrument for concurrent observations of NO2 and CO2
Author(s): David Nijkerk, Emanuela Palombo, Nurcan K. Alpay, Anton Leemhuis, TNO (Netherlands)
4 September 2023 • 09:20 - 09:40 | E103

12735-13
Detection of urban fugitive dust emission sources from optical satellite remote sensing images
Author(s): Xiaoqing He, Zhibao Wang, Northeast Petroleum Univ. (China); Lu Bai, Univ. of Ulster (United Kingdom); Mei Wang, Northeast Petroleum Univ. (China); Meng Fan, State Key Lab. of Remote Sensing Science (China)
4 September 2023 • 09:40 - 10:00 | E103

12735-15

Monitoring air quality using remote sensing based on a Google Earth engine application in countries with limited air quality data and control policies: a case study in Ecuador

Author(s): Cesar Ivan Alvarez, Univ. Politécnica Salesiana (Ecuador); Santiago Lopez, Univ. of Washington Bothell (United States); David Vasquez, Univ. Politécnica Salesiana (Ecuador)

4 September 2023 • 10:00 - 10:20 | E103

Coffee Break 10:20 - 10:50

SESSION 4: URBAN AIR QUALITY II

4 September 2023 • 10:50 - 12:30 | E103
Session Chair: Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

12735-16

Multiwavelength LED lidar for near-ground aerosol distribution measurement

Author(s): Alifu Xiafukaiti, Chiba Univ. (Japan), Mitsubishi Electric Corp. (Japan); Kosuke Okubo, Nofel Lagrosas, Tatsuo Shiina, Chiba Univ. (Japan)

4 September 2023 • 10:50 - 11:10 | E103

12735-17

Improvement of the system efficiency of low coherence Doppler lidar

Author(s): Kosuke Okubo, Nofel Lagrosas, Tatsuo Shiina, Chiba Univ. (Japan)

4 September 2023 • 11:10 - 11:30 | E103

12735-18

The effect of long-term exposure to air pollution on COVID-19 mortality in western Maharashtra, India: a study using remotely sensed data

Author(s): Shailesh Deshpande, Chaman Banolia, Shreyansh Aswal, Tata Research Development and Design Ctr. (India); Balamuralidhar P., Tata Consultancy Services (India)

4 September 2023 • 11:30 - 11:50 | E103

12735-19

The future of urban air quality management in Thailand: the cutting-edge platform for monitoring and management of public health and sustainable development

Author(s): Chanika Sukawattanavijit, Jiratiwan Kruasilp, Pramet Kaewmesri, Kulapach Lhapawong, Nuntikorn Kitratporn, Geo-Informatics and Space Technology Development Agency (Thailand); Kornwipa Punnasiri, Tipkamon Pumipan, Ministry of Public Health (Thailand)

4 September 2023 • 11:50 - 12:10 | E103

12735-37

Regional mobility patterns and exposure to environmental stressors: effects on the health risk assessments due to air pollution

Author(s): Lorenza Gilardi, Mattia Marconcini, Annekatrin Metz-Marconcini, Thomas Esch, Hannes Taubenboeck, Thilo Erbertseder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

4 September 2023 • 12:10 - 12:30 CEST | E103

Lunch/Exhibition Break 12:30 - 13:50

SESSION 5: URBAN CLIMATE

4 September 2023 • 13:50 - 15:30 | E103
Session Chair: Nektarios Chrysoulakis, Foundation for Research and Technology-Hellas (Greece)

12735-20

Sensitivity analysis of Sentinel-2 data for urban tree characterization using DART model

Author(s): Théo Le Saint, Littoral, Environnement, Télédétection, Géomatique (France), Rennes Métropole (France); Jean Nabucet, Littoral, Environnement, Télédétection, Géomatique (France); Sidonie Lefebvre, Karine Adeline, ONERA (France); Laurence Hubert-Moy, Littoral, Environnement, Télédétection, Géomatique (France)

4 September 2023 • 13:50 - 14:10 | E103

12735-21

Development of the TANGO carbon instrument for greenhouse gas detection

Author(s): James Day, Benjamin J. M. Brenny, Emanuela Palombo, Bryan de Goeij, Bas Ouwerkerk, Grzegorz Misiun, Martin Lemmen, Nurcan K. Alpay, Anton Leemhuis, TNO (Netherlands); Jochen Landgraf, SRON (Netherlands); Davit Sivil, Bernhard Michel, Hembach Photonik GmbH (Germany); Agne Paskeviciute, Christophe Buisset, Roman Windpassinger, Alizee Malavart, European Space Agency (Netherlands)

4 September 2023 • 14:10 - 14:30 | E103

12735-22

Real-time imaging of methane gas from a UAV mounted system

Author(s): Angus G. MacGruer, Graham Gibson, Kyle Nutt, Miles Padgett, Univ. of Glasgow (United Kingdom)

4 September 2023 • 14:30 - 14:50 | E103

12735-23

Spectral analysis and mapping of unregulated landfills by planning areas (NUTS 2) in Bulgaria

Author(s): Temenuzhka Spasova, Space Research and Technology Institute (Bulgaria)

4 September 2023 • 14:50 - 15:10 | E103

12735-24

An adaptive approach for spatio-temporal land surface temperature image fusion

Author(s): Ibrahim Adeniran, The Hong Kong Polytechnic Univ. (Hong Kong, China)

4 September 2023 • 15:10 - 15:30 | E103

Coffee Break 15:30 - 16:00

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4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12735-26

Research on the expansion of Beijing-Tianjin-Hebei China's capital metropolitan agglomeration based on night lighting technology

Author(s): Xu Zhang, Josep Roca Cladera, Blanca Arellano Ramos, Univ. Politècnica de Catalunya (Spain)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12735-27

Land surface albedo changes induced by urbanization over Bucharest metropolitan area

Author(s): Maria A. Zoran, Roxana S. Savastru, Dan M. Savastru, Marina N. Tautan, National Institute of Research and Development for Optoelectronics (Romania); Adrian C. Penache, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12735-28

Unsupervised vehicle extraction of bounding boxes in UAV images

Author(s): Junho Yeom, Gyeongsang National Univ. (Republic of Korea); Youkyung Han, Seoul National Univ. of Science and Technology (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12735-30

Assessment of heat islands in different economic regions of Bulgaria for the needs of Destination Earth

Author(s): Temenuzhka Spasova, Daniela Avetisyan, Space Research and Technology Institute (Bulgaria)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12735-31

Harvesting remote sensing observations for quantifying burned area and built-up losses from the 2021 wildfires in Greece

Author(s): Alexandros Paganias, Christoforos Pappas, Univ. of Patras (Greece)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12735-32

Simple use of image analysis for comparing and monitoring tree foliage in an urban environment for a temperate climate area

Author(s): Mihai-Stefan Duma, Univ. Politehnica Timisoara (Romania); Virgil-Florin Duma, Univ. "Aurel Vlaicu" din Arad (Romania), Univ. Politehnica Timisoara (Romania)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12735-35

Dual attention-based deep learning approach for building segmentation of remote sensing images

Author(s): Noopur Srivastava, Kamal Jain, Indian Institute of Technology Roorkee (India)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12736

Target and Background Signatures IX

3 - 4 September 2023 | E108

Conference Chairs: **Karin Stein,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Ric Schleijpen,** TNO Defence, Security and Safety (Netherlands)

Programme Committee: **Joanne B. Culpepper,** Defence Science and Technology Group (Australia); **Willem H. Gunter,** Institute for Maritime Technology (South Africa); **Daniela H. Heinrich,** Norwegian Defence Research Establishment (Norway); **Maarten A. Hogervorst,** TNO (Netherlands); **Stacy E. Howington,** U.S. Army Engineer Research and Development Ctr. (United States); **Katrin Idla,** Tallinn Univ. of Technology (Estonia); **Hans M. Kariis,** Swedish Defence Research Agency (Sweden); **Luc Labarre,** ONERA (France); **Alexander Schwarz,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Peter Wellig,** Armasuisse (Switzerland)

SUNDAY 3 SEPTEMBER 2023

WELCOME AND OPENING REMARKS

3 September 2023 • 13:45 - 13:50 | E108
Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)
Ric Schleijpen, TNO Defence, Security and Safety (Netherlands)
Conference Chairs

SESSION 1: AI AND COUNTER-AI

3 September 2023 • 13:50 - 15:00 | E108
Session Chair: Ric H.M.A. Schleijpen, TNO (Netherlands)

12736-1
Evolving camouflage *(Invited Paper)*
Author(s): Erik Van der Burg, Alexander Toet, Maarten Hogervorst, TNO (Netherlands)
3 September 2023 • 13:50 - 14:20 | E108

12736-2
Evaluation of dual attribute adversarial camouflage and counter-AI reconnaissance methods in terms of more realistic spatial alignment
Author(s): Alexander Schwegmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
3 September 2023 • 14:20 - 14:40 | E108

12736-3
Developing dual attribute adversarial camouflage for counter-AI reconnaissance
Author(s): Claudia S. Hübner, Alexander Schwegmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
3 September 2023 • 14:40 - 15:00 | E108

Coffee Break 15:00 - 15:30

SESSION 2: SCENE GENERATION

3 September 2023 • 15:30 - 16:40 | E108
Session Chairs: Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Ric H.M.A. Schleijpen, TNO (Netherlands)

12736-4
Modeling EO/IR systems with ASSET: spectral super-resolution for synthetic WFOV background signature generation *(Invited Paper)*
Author(s): James D. Menezes, Ayden M. Coughlin, Bret Wagner, Bryan Steward, Shannon R. Young, Air Force Institute of Technology (United States)
3 September 2023 • 15:30 - 16:00 | E108

12736-6
Hybrid simulation ray-tracing improvements for creating realistic scenes for signature assessment
Author(s): Koen van der Sanden, Maarten Hogervorst, Piet Bijl, TNO (Netherlands)
3 September 2023 • 16:00 - 16:20 | E108

12736-7
Signature analysis in synthetic aperture radar imagery with a radar target simulator
Author(s): Lidia-Marta Netedu-Amarandi, Univ. Zürich (Switzerland); Marcel Merz, Olivier Progin, Laurent Nagy, Armasuisse (Switzerland); Michael Caris, Fraunhofer-Institut für Hochfrequenzphysik und Radartechnik FHR (Germany); Peter Wellig, Armasuisse (Switzerland); Daniel Henke, Elias Mendez Dominguez, Univ. Zürich (Switzerland)
3 September 2023 • 16:20 - 16:40 | E108

MONDAY 4 SEPTEMBER 2023

SESSION 3: SURFACE MATERIALS

September 2023 • 08:30 - 10:20 | E108
Session Chair: Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12736-8
Nanocellulose-based films for camouflage applications *(Invited Paper)*
Author(s): Jennifer Silander, Peter Rejmstad, Tomas Hallberg, Christina Åkerlind, FOI-Swedish Defence Research Agency (Sweden)
4 September 2023 • 08:30 - 09:00 | E108

12736-9

Spectral reflectance properties of sand layers covering an underlying target: experimental measurements and mathematical modelling

Author(s): Gorm K. Selj, Alexander Mikkelsen, Norwegian Defence Research Establishment (Norway)

4 September 2023 • 09:00 - 09:20 | E108

12736-10

Optical properties of water absorbing textiles for camouflage

Author(s): Eveline Örtenberg, Peter Rejmstad, Christina Åkerlind, FOI-Swedish Defence Research Agency (Sweden)

4 September 2023 • 09:20 - 09:40 | E108

12736-11

Camouflage performance of winter uniforms: photosimulations in the visual spectrum

Author(s): Alexander Mikkelsen, Gorm K. Selj, Niels Nielsen, Norwegian Defence Research Establishment (Norway)

4 September 2023 • 09:40 - 10:00 | E108

12736-12

Low-emissive paint with silver nanowires

Author(s): Tomas Hallberg, Märta Håkansson, Eveline Örtenberg, FOI-Swedish Defence Research Agency (Sweden)

4 September 2023 • 10:00 - 10:20 | E108

Coffee Break 10:20 - 10:50

SESSION 4: MONITORING SIGNATURE AND ENVIRONMENT

4 September 2023 • 10:50 - 12:00 | E108
Session Chair: Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12736-13

Simple modelling of CUBI surface temperatures: an operational perspective *(Invited Paper)*

Author(s): Arthur D. van Rheenen, Norwegian Defence Research Establishment (Norway)

4 September 2023 • 10:50 - 11:20 | E108

12736-14

Infrared atmospheric radiative transfer: a fast computational approach with agile MODTRAN atmosphere reconstruction

Author(s): Giuseppe Auricchio, Francesco Castaldo, Leonardo S.p.A. (Italy)

4 September 2023 • 11:20 - 11:40 | E108

12736-15

Design and implementation of a micrometeorological weather station for ground-based swarm environments

Author(s): Ullmer Lars, Thomas Kociok, Eisele Christian, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Alexander M. J. van Eijk, TNO (Netherlands); Stein Karin, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

4 September 2023 • 11:40 - 12:00 | E108

Lunch/Exhibition Break 12:00 - 13:40

SESSION 5: DETECTION AND PERFORMANCE OF HUMANS AND SENSORS

4 September 2023 • 13:40 - 15:30 | E108
Session Chair: Hans M. Kariis, FOI-Swedish Defence Research Agency (Sweden)

12736-16

Machine learning approach for extracting radiometric data from RGB images: a preliminary study *(Invited Paper)*

Author(s): Joanne B. Culpepper, Tauseef Gulrez, Defence Science and Technology Group (Australia)

4 September 2023 • 13:40 - 14:10 | E108

12736-17

Multi-image deconvolution of thermal images with a boundary condition weighting scheme

Author(s): Florian Piras, François Marelli, Idiap Research Institute (Switzerland); Edouard De Moura Presa, Peter Wellig, Armasuisse (Switzerland); Michael Liebling, Idiap Research Institute (Switzerland)

4 September 2023 • 14:10 - 14:30 | E108

12736-18

Histogram-probabilistic multi-hypothesis tracking with a Poisson mixture measurement process

Author(s): Lukas Herrmann, Edmund Brekke, Egil Eide, Norwegian Univ. of Science and Technology (Norway)

4 September 2023 • 14:30 - 14:50 | E108

12736-19

Adaptive, gamified tool for target signature training

Author(s): Daniel Atorf, Joanna Müller, Ehm Kannegieser, Sergius Dyck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

4 September 2023 • 14:50 - 15:10 | E108

12736-20

Optimized integrative system design in satellite with MWIR/LWIR hyperspectral imaging based on multidimensional SCR and random forest learning

Author(s): Shaocong Liu, Zhen Li, Jing Cao, Tinghao Liu, Xianfei Qiu, Haixiao Yin, China Academy of Space Technology (China)

4 September 2023 • 15:10 - 15:30 | E108

Coffee Break 15:30 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

CLOSING REMARKS

4 September 2023 • 15:30 - 15:35 | E108

Karin Stein, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)

Ric Schleijpen, TNO Defence, Security and Safety (Netherlands)

Conference Chairs

Conference 12737

Electro-optical and Infrared Systems: Technology and Applications XX

3 - 5 September 2023 | D203

Conference Chairs: **Duncan L. Hickman,** Tektonex Ltd. (United Kingdom); **Helge Bürsing,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Gary W. Kamerman; Ove Steinvall,** FOI-Swedish Defence Research Agency (Sweden)

Programme Committee: **Gianni Barani,** Leonardo (Italy); **Piet Bijl,** TNO Defence, Security and Safety (Netherlands); **Rainer Breiter,** AIM INFRAROT-MODULE GmbH (Germany); **Judith Dijk,** TNO Defence, Security and Safety (Netherlands); **Bernd Eberle,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Natan S. Kopeika,** Ben-Gurion Univ. of the Negev (Israel); **Robert A. Lamb,** SELEX ES (United Kingdom); **Daniel A. Lavigne,** Defence Research and Development Canada, Valcartier (Canada); **Gino Putrino,** The Univ. of Western Australia (Australia); **Stanley R. Rotman,** Ben-Gurion Univ. of the Negev (Israel); **Frank Rutz,** Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany); **Philip J. Soan,** Defence Science and Technology Lab. (United Kingdom)

SUNDAY 3 SEPTEMBER 2023

SESSION 1: SENSORS AND TECHNOLOGY I

3 September 2023 • 13:30 - 15:10 | D203
Session Chair: Duncan L. Hickman, Tektonex Ltd. (United Kingdom)

12737-1
High-performance silicon-based nano-thermoelectric bolometers for uncooled infrared sensing *(Invited Paper)*
Author(s): Aapo Varpula, Anton Murros, Kuura Sovanto, Arto Rantala, David Gomes Martins, Kirsi Tappura, Jonna Tiira, Mika Prunnila, VTT Technical Research Ctr. of Finland Ltd. (Finland)
3 September 2023 • 13:30 - 14:00 | D203

12737-2
Uncooled thermal MWIR imagers for high-temperature imaging applications *(Invited Paper)*
Author(s): Marvin Michel, Sebastian Blaeser, Alexander Litke, Elahe Zakizade, Sascha Weyers, Dirk Weiler, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme IMS (Germany)
3 September 2023 • 14:00 - 14:30 | D203

12737-3
Mixed oxide provides an efficient solution to near infrared detection
Author(s): Antoine Cheneau, Univ. Paris-Saclay, CentraleSupélec, CNRS; Sorbonne Univ (France); Annick F. Dégardin, Alain J. Kreisler, Univ. Paris-Saclay, CentraleSupélec, CNRS; Sorbonne Univ. (France)
3 September 2023 • 14:30 - 14:50 | D203

12737-5
Influence of mid-infrared laser pulse on in-band damage threshold of HgCdTe material in the photodetector
Author(s): Dong Li, Zhongling Liu, AVIC Manufacturing Technology Institute (China)
3 September 2023 • 14:50 - 15:10 | D203

Coffee Break 15:10 - 15:40

SESSION 2: SENSORS AND TECHNOLOGY II

3 September 2023 • 15:40 - 16:50 | D203
Session Chair: Duncan L. Hickman, Tektonex Ltd. (United Kingdom)

12737-6
Improved MCT eSWIR modules for various demands of imaging applications *(Invited Paper)*
Author(s): Robert Wiegleb, Rainer Breiter, Holger Lutz, Alexander Sieck, AIM INFRAROT-MODULE GmbH (Germany)
3 September 2023 • 15:40 - 16:10 | D203

12737-7
Investigation of InGaAsSb-based heterojunction photodiodes for extended SWIR imaging
Author(s): Andreas Woerl, Raphael Mueller, Volker Daumer, Jasmin Niemasz, Frank Rutz, Robert Rehm, Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany)
3 September 2023 • 16:10 - 16:30 | D203

12737-8
Saddle-shape whispering gallery mode resonators: μm- to cm- scale
Author(s): Eyal Yacoby, Soreq Nuclear Research Ctr. (Israel); Yosef London, Bar-Ilan Univ. (Israel)
3 September 2023 • 16:30 - 16:50 | D203

MONDAY 4 SEPTEMBER 2023

SESSION 3: ACTIVE IMAGING AND LASER APPLICATIONS

4 September 2023 • 09:20 - 11:30 | D203
Session Chair: Helge Bürsing, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12737-9
Compact ultra-high-definition mixed reality holographic projections with optical fiber lasers *(Invited Paper)*
Author(s): Jana Skirnewskaja, Univ. of Cambridge (United Kingdom); Yunuen Montelongo, Univ. of Oxford (United Kingdom); Timothy D. Wilkinson, Univ. of Cambridge (United Kingdom)
4 September 2023 • 09:20 - 09:50 | D203

12737-10

Design of an imaging system for turbulence mitigation using phase diversity *(Invited Paper)*

Author(s): Nicolas Boehrer, Robert P. J. Nieuwenhuizen, Judith Dijk, Bart van de Laar, Benjamin Brenny, Niek Doelman, TNO (Netherlands)

4 September 2023 • 09:50 - 10:20 | D203

Coffee Break 10:20 - 10:50

12737-11

The practicalities of a spatial coherence filter in free-space LIDAR environments

Author(s): Paul Hawthorne, Heriot-Watt Univ. (United Kingdom), MBDA UK Ltd. (United Kingdom); Mark W. McDonald, Heriot-Watt Univ. (United Kingdom); Ian Park, MBDA UK Ltd. (United Kingdom); Duncan P. Hand, Heriot-Watt Univ. (United Kingdom)

4 September 2023 • 10:50 - 11:10 | D203

12737-15

Gated viewing at 2.09 μm laser wavelength: Experimental system assessment and comparison to 1.57 μm

Author(s): Benjamin Göhler, Peter Lutzmann, Dominik Walter, Helge Bürsing, Johannes Deutsch, Marc Eichhorn, Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Alexander Sieck, Robert Wiegleb, AIM INFRAROT-MODULE GmbH (Germany)

4 September 2023 • 11:10 - 11:30 | D203

Lunch/Exhibition Break 11:30 - 13:00

SESSION 4: SYSTEMS AND APPLICATIONS I

4 September 2023 • 13:00 - 15:30 | D203
Session Chair: Duncan L. Hickman, Tektonex Ltd. (United Kingdom)

12737-16

The multispectral mid-wave infrared (MWIR) camera payload of nanosatellite ERNST *(Invited Paper)*

Author(s): Frank Schäfer, Martin Schimmerohn, Clemens Horch, Noah Ledford, Konstantin Schäfer, Thorsten Maue, Mike Weber, Stephan Busch, Konstantin Kappe, Klaus Hoschke, Fraunhofer-Institut für Kurzzeitdynamik, Ernst-Mach-Institut, EMI (Germany); Caroline Schweitzer, Norbert Scherer-Negenborn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

4 September 2023 • 13:00 - 13:30 | D203

12737-17

Development of a long wave infrared photonic Doppler velocimeter

Author(s): Gregory Lefrere, Commissariat à l'Energie Atomique, DAM Ile de France (France), Ctr. National de la Recherche Scientifique, Institut FOTON, Univ. de Rennes (France); Jean-Marc Goujon, Luiz Poffo, Ctr. National de la Recherche Scientifique, Institut FOTON, Univ. de Rennes (France); Pascal Besnard, Ronan Le Page, Ctr. National de la Recherche Scientifique (France); Yohan Barbarin, Commissariat à l'Energie Atomique, DAM Ile de France (France)

4 September 2023 • 13:30 - 13:50 | D203

12737-18

Design of a unique optical bench for complete performance characterization of night vision device

Author(s): Morgane Lardennois, Romane Dorino, Adrien Bertaud, Marie De Masson d'Autume, Guillaume Arquetoux, Arnaud Louboutin, Catherine Barrat, Romain Guider, HGH Systèmes Infrarouges (France)

4 September 2023 • 13:50 - 14:10 | D203

12737-20

Interference effect of mid-infrared laser on the quaternary cross-detector

Author(s): Zhongling Liu, Dong Li, AVIC Manufacturing Technology Institute (China)

4 September 2023 • 14:30 - 14:50 | D203

12737-21

Simulation of a tomographic scanning single-pixel imager using rosette-scan

Author(s): Armand Duvenage, Warren du Plessis, Univ. of Pretoria (South Africa)

4 September 2023 • 14:50 - 15:10 | D203

12737-40

A lightweight design solution for laser communication transmitters and receivers

Author(s): Sifan Wang, Yi Wang, AVIC Manufacturing Technology Institute (China)

4 September 2023 • 15:10 - 15:30 | D203

Coffee Break 15:30 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction
16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

SESSION 5: MODELLING AND SIMULATION I

5 September 2023 • 09:00 - 10:30 | D203
Session Chairs: Helge Bürsing, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Helge Bürsing, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12737-22

Thermal imagers with boost: range prediction with the Johnson criteria *(Invited Paper)*

Author(s): Uwe Adomeit, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

5 September 2023 • 09:00 - 09:30 | D203

12737-23
Parameterised MRTD
Author(s): Steinar Borve, Norwegian Defence Research Establishment (Norway)
5 September 2023 • 09:30 - 09:50 | D203

12737-24
Impact of motion blur on recognition rates of CNN-based TOD classifier models
Author(s): Daniel Wegner, Stefan Keßler, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 09:50 - 10:10 | D203

12737-25
Error analysis of a multi-sensor maritime targeting system
Author(s): Duncan L. Hickman, Maria Niebla, Tektonex Ltd. (United Kingdom); Daekyu Sang, Boomin Kim, Jeonghyun Baek, Agency for Defense Development (Republic of Korea)
5 September 2023 • 10:10 - 10:30 | D203

Coffee Break 10:30 - 11:00

SESSION 6: SYSTEMS AND APPLICATIONS II

5 September 2023 • 11:00 - 12:00 | D203
Session Chair: Helge Bürsing, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12737-27
Data gathering trials for the development of military imaging systems
Author(s): Maria Niebla, Duncan L. Hickman, Tektonex Ltd. (United Kingdom); Eunjin Koh, Chanyong Lee, Hoseong Kim, Chaehyeon Lim, Sunghwan Kim, Agency for Defense Development (Republic of Korea)
5 September 2023 • 11:00 - 11:20 | D203

12737-41
Modular turn-key system for testing the spectral response of detectors and cameras in the VIS/NIR and MID/FAR IR
Author(s): Dario Cabib, Moshe Elkabets, CI Systems (Israel) Ltd. (Israel)
5 September 2023 • 11:20 - 11:40 | D203

12737-42
The design method of off-axis reflective stabilized-zoom system based on deformable mirrors
Author(s): Yuxuan Tian, Xuemin Cheng, Tsinghua Univ. (China); Qun Hao, Changchun Univ. of Science and Technology (China)
5 September 2023 • 11:40 - 12:00 | D203

Lunch/Exhibition Break 12:00 - 13:30

SESSION 7: LASER SENSING

5 September 2023 • 13:30 - 15:00 | D203
Session Chair: Ove Steinvall, FOI-Swedish Defence Research Agency (Sweden)

12737-29
Design and development of an integrated lidar sensor for autonomous driving *(Invited Paper)*
Author(s): Andreas Hofbauer, Rainer Reichert, RIEGL Research Forschungsgesellschaft mbH (Austria); Marcus Edward Hennecke, Infineon Technologies Austria AG (Austria); Marcus Baumgart, Andreas Tortschanoff, Silicon Austria Labs GmbH (Austria); Boris Kirillov, Infineon Technologies Austria AG (Austria); Martin Pfennigbauer, RIEGL Research Forschungsgesellschaft mbH (Austria)
5 September 2023 • 13:30 - 14:00 | D203

12737-30
Laser scanners with polygonal mirrors: optomechanical analysis and design
Author(s): Virgil-Florin Duma, Univ. "Aurel Vlaicu" din Arad (Romania), Univ. Politehnica Timisoara (Romania); Maria-Alexandra Duma, Univ. of Groningen (Netherlands)
5 September 2023 • 14:00 - 14:20 | D203

12737-31
Laser Doppler multi-beam differential vibrometers for detection of buried objects
Author(s): Vyacheslav Aranchuk, Boyang Zhang, The Univ. of Mississippi (United States); Stanley Johnson, Coherent Light Science, LLC (United States); Ina Aranchuk, Craig Hickey, The Univ. of Mississippi (United States)
5 September 2023 • 14:20 - 14:40 | D203

12737-32
Optical instrumentation development for tracking and reconnaissance of satellites
Author(s): B. Perlingeiro Corrêa, David L. Bakker, Fabrizio Silvestri, Gustavo C. Amaral, Eugenio Di Iorio, Ralph C. Snel, Ivan Ferrario, TNO (Netherlands)
5 September 2023 • 14:40 - 15:00 | D203

Coffee Break 15:00 - 15:30

SESSION 8: PASSIVE EO SENSING

5 September 2023 • 15:30 - 17:00 | D203
Session Chair: Ove Steinvall, FOI-Swedish Defence Research Agency (Sweden)

12737-33
Criterion for quantifying the amount of spatial and spectral information acquired by hyperspectral cameras *(Invited Paper)*
Author(s): Andrei Fridman, Norsk Elektro Optikk AS (Norway); Torbjørn Skauli, Univ. of Oslo (Norway); Philippe Deliot, ONERA (France); John R. Gilchrist, Clyde Hyperspectral Imaging and Technology Ltd. (United Kingdom); Trond Løke, Norsk Elektro Optikk AS (Norway)
5 September 2023 • 15:30 - 16:00 | D203

12737-34
A new remote sensing electro-optical system on low-light target
Author(s): Jing-Jing Ge, Beijing Institute of Space Mechanics and Electricity (China)
5 September 2023 • 16:00 - 16:20 | D203

Conference 12737

12737-35

Passive real-time hyperspectral imager based of Fabry-Pérot interferometer filter technology

Author(s): Alexander Kokka, Christer Holmlund, Leevi Salonen, Olli Ihalainen, Heikki Astola, Matti Mõttus, Rami Mannila, Timo Ihatsu, Ingmar Stuns, VTT Technical Research Ctr. of Finland Ltd. (Finland)

5 September 2023 • 16:20 - 16:40 | D203

12737-36

Spectropolarimetry for space object identification

Author(s): Ralph C. Snel, TNO (Netherlands); Bogdan Vasilescu, Technische Univ. Delft (Netherlands); Eugenio Di Iorio, TNO (Netherlands); Pierre Piron, Jérôme Loicq, Technische Univ. Delft (Netherlands); Ivan Ferrario, Fabrizio Silvestri, TNO (Netherlands)

5 September 2023 • 16:40 - 17:00 | D203

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12737-19

Concave and convex deformable mirrors for continuous LWIR zoom system

Author(s): Bong Je Park, Suntak Park, Seung Koo Park, Eun Jin Shin, Electronics and Telecommunications Research Institute (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12737-37

Performance studies of two active SWIR instrument designs for vision enhancement in indoor applications

Author(s): Enno Peters, Max Anders, Tristan Preis, Laura Kontschak, Jendrik Schmidt, Maurice Stephan, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12737-38

Design new stabilization control for thermal sigh with headmirror

Author(s): Hiep D. Nguyen, Thuan Vu, Ban Nguyen, Viettel High-Tech Industrial Corp. (Vietnam); Thai Luu, Sungkyunkwan Univ. (Republic of Korea)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12737-39

Optical choppers: novel approaches for higher chop frequencies

Author(s): Eduard Csukas, Univ. Politehnica Timisoara (Romania); Dorin Demian, Univ. Aurel Vlaicu Arad (Romania); Virgil-Florin Duma, Univ. "Aurel Vlaicu" din Arad (Romania), Univ. Politehnica Timisoara (Romania)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12738

Technologies for Optical Countermeasures XIX

5 September 2023 | E103

Conference Chairs: **Robert J. Grass,** NASA Goddard Space Flight Ctr. (United States); **Marc Eichhorn,** Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Gareth D. Lewis,** Royal Military Academy (Belgium)

Programme Committee: **Frances Bodrucki,** The Univ. of North Carolina at Charlotte (United States); **Pierre Bourdon**, ONERA (France); **Christopher D. Burgess**, Defence Science and Technology Lab. (United Kingdom); **M. J. Daniel Esser**, Heriot-Watt Univ. (United Kingdom); **Markus Henriksson**, FOI-Swedish Defence Research Agency (Sweden); **James P. Hitscherich**, U.S. Army Combat Capabilities Development Command (United States); **Itor James**, Defence Science and Technology Lab. (United Kingdom); **Arkadiy A. Lyakh**, Univ. of Central Florida (United States); **William Ted Masselink**, Humboldt-Univ. zu Berlin (Germany); **Richard Maulini**, Alpes Lasers SA (Switzerland); **Curtis R. Menyuk**, Univ. of Maryland, Baltimore County (United States); **Eric D. Park**, Q-Peak, Inc. (United States); **Martin C. Richardson**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Jasbinder S. Sanghera**, U.S. Naval Research Lab. (United States); **Ric H. M. A. Schleijpen**, TNO Defence, Security and Safety (Netherlands); **Bastian Schwarz**, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); **Ove Steinvall**, Swedish Defence Research Agency (Sweden); **Alexander M. J. van Eijk**, TNO Defence, Security and Safety (Netherlands); **Hans-Dieter Tholl**, Diehl BGT Defence GmbH & Co. KG (Germany); **Marijke Vandewal**, Royal Military Academy (Belgium)

MONDAY 4 SEPTEMBER 2023

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction
16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*
Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)
4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*
Author(s): Peter Werkhoven, TNO (Netherlands)
4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*
Author(s): Nicolaus Hanowski, ESRIN (Italy)
4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

WELCOME AND OPENING REMARKS

5 September 2023 • 08:30 - 08:40 | E103
Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
Gareth D. Lewis, Royal Military Academy (Belgium)
Conference Chairs

SESSION 1: KEYNOTE

5 September 2023 • 08:40 - 10:00 | E103
Session Chairs: Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Gareth D. Lewis, Royal Military Academy (Belgium)

12738-1

The disruptive Impact of dynamic laser dazzling on template matching algorithms applied to thermal infrared imagery *(Keynote Presentation)*
Author(s): Gareth D. Lewis, Alexander Borghgraef, Marijke Vandewal, Royal Military Academy (Belgium)
5 September 2023 • 08:40 - 09:20 | E103

12738-2

Recent advances in SWIR and MWIR fiber and solid-state laser sources *(Keynote Presentation)*
Author(s): Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 09:20 - 10:00 | E103

Coffee Break 10:00 - 10:30

SESSION 2: LASER EFFECTS

5 September 2023 • 10:30 - 12:30 | E103
Session Chairs: Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Gareth D. Lewis, Royal Military Academy (Belgium)

12738-3

Laser dazzling: an overview *(Invited Paper)*
Author(s): Ove Steinvall, FOI-Swedish Defence Research Agency (Sweden)
5 September 2023 • 10:30 - 11:00 | E103

12738-4

Laser dazzling in the visible region: some issues *(Invited Paper)*
Author(s): Ove Steinvall, FOI-Swedish Defence Research Agency (Sweden)
5 September 2023 • 11:00 - 11:30 | E103

12738-5

Modelling the heating of GFRP by high-energy laser radiation considering the pyrolysis of binder material

Author(s): Rüdiger Schmitt, Vadim Allheily, Institut Franco-Allemand de Recherches de Saint-Louis (France)

5 September 2023 • 11:30 - 11:50 | E103

12738-6

Stimulated scattering lasers in diamond: increasing power, frequency range and coherence

Author(s): Rich P. Mildren, Macquarie Univ. (Australia)

5 September 2023 • 11:50 - 12:10 | E103

12738-7

Investigations on the laser radar cross section of optical components

Author(s): Sebastian Stutz, Max Schiller, Bernd Eberle, Michael Henrichsen, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

5 September 2023 • 12:10 - 12:30 | E103

Lunch/Exhibition Break 12:30 - 13:40

SESSION 3: BEAM STEERING, POINTING AND CONTROL

5 September 2023 • 13:40 - 14:30 | E103
Session Chair: Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12738-8

Spatial channel multiplexing emulation with a 21-channel multiplane plane light converter
(Invited Paper)

Author(s): David M. Benton, Aston Univ. (United Kingdom); Antonin Billaud, Cailabs (France); Andrew Ellis, Yiming Li, Zhouyi Hu, Aston Univ. (United Kingdom)

5 September 2023 • 13:40 - 14:10 | E103

12738-17

Demonstration of a 3kW power laser effector system countermeasuring a microdrone

Author(s): Ida Bellucci, Alessandro Perna, Pasquale Ferrara, Alberto Iberto Cosentino, Simone Ciotti, Marco Galanti, Andrea Currò Dossi, Federica Auletta, Emanuele Biagioli, Marco Quercioli, Emanuele Guadagnoli, Nicola Santini, Leonardo S.p.A. (Italy)

5 September 2023 • 14:10 - 14:30 | E103

SESSION 4: LASER SOURCES AND POWER SCALING

5 September 2023 • 14:30 - 15:30 | E103
Session Chair: Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12738-10

Recent improvements of quantum cascade lasers for DIRCM at mirSense

Author(s): Mathieu Carras, Gregory Maisons, Johan Abautret, Roland Teissier, Fahem Boulila, Mickael Brun, Thomas Shutz, Maxime Guais, mirSense (France)

5 September 2023 • 14:30 - 14:50 | E103

12738-11

Investigation of the temperature dependence of core-pumped 2 μm thulium-doped fiber lasers

Author(s): Dieter Panitzek, Clément Romano, Marc Eichhorn, Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

5 September 2023 • 14:50 - 15:10 | E103

12738-12

Power scaling of segmented and homogeneously doped Ho^{3+}: YAG laser resonators

Author(s): Katharina Goth, Marius Rupp, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Karlsruher Institut für Technologie (Germany); Michael Griesbeck, Madeleine Eitner, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Karlsruher Institut für Technologie (Germany); Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

5 September 2023 • 15:10 - 15:30 | E103

Coffee Break 15:30 - 16:00

SESSION 5: LASER AGAINST PERSONNEL

5 September 2023 • 16:00 - 17:20 | E103
Session Chair: Gareth D. Lewis, Royal Military Academy (Belgium)

12738-13

An approach for laser safety calculations for electro-optical imaging systems

Author(s): Gunnar Ritt, Bastian Schwarz, Bernd Eberle, Michael Henrichsen, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

5 September 2023 • 16:00 - 16:20 | E103

12738-14

Investigating the impact of laser dazzling on shooting performance in a simulator environment

Author(s): Tomas Foldes, Royal Military Academy (Belgium); Helena Pereira, Univ. de Lisboa (Portugal), FCT NOVA (Portugal); Cornelia Nita, Royal Military Academy (Belgium); Hugo A. Ferreira, Univ. de Lisboa (Portugal); Marijke Vandewal, Royal Military Academy (Belgium)

5 September 2023 • 16:20 - 16:40 | E103

12738-15

Three-wavelength laser dazzler soft-countermeasure

Author(s): Nabil Belghachem, Ecole Militaire Polytechnique (Algeria)

5 September 2023 • 16:40 - 17:00 | E103

12738-16

0D, 1D, and 2D boron nitride nanomaterials for countermeasures in the visible spectral range

Author(s): Stefanie Dengler, Bernd Eberle, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

5 September 2023 • 17:00 - 17:20 | E103

PANEL DISCUSSION: LASER WEAPONS AND LASERS USED AS WEAPONS AGAINST PERSONNEL

5 September 2023 • 17:20 - 17:50 CEST

Moderators:

Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

Gareth D. Lewis, Royal Military Academy (Belgium)

ADJOURN

5 September 2023 • 17:50 - 17:55 | E103

CLOSING REMARKS

Conference 12739

High Power Lasers: Technology and Systems, Platforms, Effects VI

6 September 2023 | E103

Conference Chairs: **Harro Ackermann,** Joint Directed Energy Transition Office (United States)**; Willy L. Bohn,** BohnLaser Consult (Germany)

TUESDAY 5 SEPTEMBER 2023

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12739-15

The study on structural design and thermal management in directly liquid-cooled slab laser

Author(s): Han Juan, AVIC Manufacturing Technology Institute (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

WELCOME AND OPENING REMARKS

6 September 2023 • 08:45 - 08:50 | E103

Willy L. Bohn, BohnLaser Consult (Germany)

SESSION 1: ARCHITECTURES FOR POWER SCALING

6 September 2023 • 08:50 - 10:30 | E103
Session Chair: Willy L. Bohn, BohnLaser Consult (Germany)

12739-1

Beam combination system for coherent combination of high power fiber arrays *(Invited Paper)*

Author(s): Callum Wreford, Gilles Diederich, Paul Harrison, Paul Graham, Natalia Trela-McDonald, PowerPhotonic Ltd. (United Kingdom)

6 September 2023 • 08:50 - 09:20 | E103

12739-2

Recent advances in high-power 2 µm fiber lasers systems *(Invited Paper)*

Author(s): Clément Romano, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Dieter Panitzek, Dominik Lorenz, Patrick Forster, Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Karlsruher Institut für Technologie (Germany); Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

6 September 2023 • 09:20 - 09:50 | E103

12739-3

Design and verification of high power fiber laser modular heat storage module

Author(s): Jiabin Bai, AVIC Manufacturing Technology Institute (China)

6 September 2023 • 09:50 - 10:10 | E103

12739-4

Numerical analysis of propagation conditions in which conventional adaptive optics can improve laser-directed energy weapons beam shaping

Author(s): Loes Scheers, Gregal Vissers, Pieter Piscaer, Sven Van Binsbergen, Robert Nieuwenhuizen, Roderik Overzier, Lex Van Eijk, Ric Schleijpen, TNO (Netherlands)

6 September 2023 • 10:10 - 10:30 | E103

Coffee Break 10:30 - 11:00

SESSION 2: FIBER LASERS AND BEAM COMBINATION

6 September 2023 • 11:00 - 13:00 | E103
Session Chair: Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12739-5

Overview and perspectives of fiber laser power scaling *(Invited Paper)*

Author(s): Till Walbaum, Friedrich Möller, Marco Plötner, Maximilian Strecker, Benjamin Yildiz, Johannes Nold, Stefan Kuhn, Nicoletta Haarlammert, Thomas Schreiber, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany)

6 September 2023 • 11:00 - 11:30 | E103

12739-6

Filament-mediated disruption of laser propagation *(Invited Paper)*

Author(s): Craig D. Stacey, Adam Wishart, Chris Stace, LumOptica Ltd. (United Kingdom); Henry White, Caitlin Percy, Keith Rigby, BAE Systems (United Kingdom); Gregory Vieux, Dino Jaroszynski, Univ. of Strathclyde (United Kingdom)

6 September 2023 • 11:30 - 12:00 | E103

12739-7

Filled aperture coherent beam combining using multi-plane light conversion and microcontroller-based hill climbing

Author(s): Clément Jacquard, Claire Autebert, Pierre Vernaz-Gris, Tangi Le Guennic, Julien Bayol, Pu Jian, Guillaume Labroille, CAILabs (France)

6 September 2023 • 12:00 - 12:20 | E103

12739-8

HEL atmospheric propagation: extreme stray light events

Author(s): Max Schiller, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

6 September 2023 • 12:20 - 12:40 | E103

Check the SPIE App frequently for updates, presentation times are subject to change

12739-18

10 kW wide-linewidth coherent beam combination in tiled-aperture configuration at Leonardo Laser Facility

Author(s): Fabrizio Bisesto, Leonardo S.p.A. (Italy); Alessandro Perna, Leonardo (Italy); Valentina Sacchieri, Leonardo S.p.A. (Italy); Federica Auletta, Francesco Ancona, Simone Tacchini, Alberto Cosentino, Leonardo (Italy)

6 September 2023 • 12:40 - 13:00 | E103

Lunch/Exhibition Break 13:00 - 14:10

SESSION 3: LASER EFFECTS AND SAFETY ISSUES

6 September 2023 • 14:10 - 16:40 | E103
Session Chair: Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

12739-10

Laser penetration of metal targets with high powers of up to 120 kW

Author(s): Stefan Reich, Marcel Goesmann, Martin Lueck, Jens Osterholz, Fraunhofer-Institut für Kurzzeitdynamik, Ernst-Mach-Institut, EMI (Germany)

6 September 2023 • 14:10 - 14:30 | E103

12739-11

Testing the vulnerability of lightweight drone propellers to high-energy laser irradiations

Author(s): Vadim Allheily, Lionel Merlat, Institut Franco-Allemand de Recherches de Saint-Louis (France)

6 September 2023 • 14:30 - 14:50 | E103

Coffee Break 14:50 - 15:20

12739-12

The effect of laser irradiation on contrast and image quality of infrared window materials

Author(s): Karel Desnijder, Gareth Lewis, Marijke Vandewal, Royal Military Academy (Belgium)

6 September 2023 • 15:20 - 15:40 | E103

12739-13

Investigation of the polymer material perforation time: comparison between two fiber laser wavelengths

Author(s): Clément Romano, Gunnar Ritt, Michael Henrichsen, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany), Karlsruher Institut für Technologie (Germany); Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)

6 September 2023 • 15:40 - 16:00 | E103

12739-14

Study on surface morphology changes of carbon fiber composite materials under laser irradiation

Author(s): Lei Gong, Hongrui Wang, Chi Zhang, AVIC Manufacturing Technology Institute (China)

6 September 2023 • 16:00 - 16:20 | E103

12739-17

Duality safety/efficiency for laser directed energy weapon applications

Author(s): Maximilian Taillandier, MBDA France (France); Raymond Peiffer, MBDA (France); Geoffrey Darut, Christophe Verdy, UTBM CNRS ICB (France); Charly Regnault, Matthieu Pommies, ALPhANOV (France)

6 September 2023 • 16:20 - 16:40 | E103

Conference 12740

Emerging Imaging and Sensing Technologies for Security and Defence VIII

5 - 6 September 2023 | E108

Conference Chairs: **Gerald S. Buller,** Heriot-Watt Univ. (United Kingdom); **Paul M. Alsing,** Air Force Research Lab. (United States); **Neil A. Salmon,** MMW Sensors Ltd. (United Kingdom); **Richard C. Hollins,** Defence Science and Technology Lab. (United Kingdom); **Robert A. Lamb,** Leonardo MW Ltd. (United Kingdom); **Martin Laurenzis,** Institut Franco-Allemand de Recherches de Saint-Louis (France); **Michael L. Fanto,** Air Force Research Lab. (United States); **Philip Walther,** Univ. Wien (Austria); **Frank Gumbmann,** Rohde & Schwarz GmbH & Co. KG (Germany)

Programme Committee: **Giulia Acconcia,** Politecnico di Milano (Italy); **Gareth Brown,** Defence Science and Technology Lab. (United Kingdom); **Markus Henriksson,** FOI-Swedish Defence Research Agency (Sweden); **Keith L. Lewis,** Sciovis Ltd. (United Kingdom); **Heli Lukner,** Univ. of Tartu (Estonia); **Jonathan C. Matthews,** Univ. of Bristol (United Kingdom); **Robert P. J. Nieuwenhuizen**, TNO (Netherlands)

TUESDAY 5 SEPTEMBER 2023

SESSION 1: LIDAR AND IMAGING

5 September 2023 • 10:30 - 12:00 | E108
Session Chair: Robert A. Lamb,
Leonardo MW Ltd. (United Kingdom)

12740-1
Scene-based Fourier pattern-sorting approach for compressive sensing *(Invited Paper)*
Author(s): Jürgen Limbach, Christian Eisele, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 10:30 - 11:00 | E108

12740-2
Area reconnaissance with heterogeneous groups of autonomous systems
Author(s): Igor Tchouchenkov, Florian Segor, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Aleksej Buller, Matthias Kollmann, Fraunhofer-Institut für Optronik (Germany)
5 September 2023 • 11:00 - 11:20 | E108

12740-3
VIS-NIR multispectral for camouflage detection
Author(s): Léopold Brouant, Hong-Liên Pham, Éloi Foucher, Aubry Picard, Safran Electronics & Defense (France)
5 September 2023 • 11:20 - 11:40 | E108

12740-4
Ghost: getting invisibly from position A to position B
Author(s): Gisela Häufel, Dimitri Bulatov, Thomas Emter, Christian Frese, Benedikt Kottler, Janko Petereit, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Arno Schmidt, Peter Solbrig, Rheinmetall Electronics GmbH (Germany); Dominik Stütz, Peter Wernerus, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)
5 September 2023 • 11:40 - 12:00 | E108

Lunch/Exhibition Break 12:00 - 13:20

SESSION 2: QUANTUM SENSING AND COMMUNICATIONS

5 September 2023 • 13:20 - 15:30 | E108
Session Chair: Robert A. Lamb,
Leonardo MW Ltd. (United Kingdom)

12740-5
Three-dimensional quantum ghost imaging *(Invited Paper)*
Author(s): Carsten Pitsch, Karlsruher Institut für Technologie (Germany); Dominik Walter, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany)
5 September 2023 • 13:20 - 13:50 | E108

12740-6
Satellite-based quantum communication and extended physical theory tests in space
Author(s): Josefine Krause, Mohammad Mishuk, Najme Ahmadi, Sebastian Ritter, Mostafa Abasifard, Kabilan Sripathy, Tobias Vogl, Friedrich-Schiller-Univ. Jena (Germany)
5 September 2023 • 13:50 - 14:10 | E108

12740-7
Benchmarking entanglement-based QKD protocols in noisy channels
Author(s): Mikolaj Lasota, Nicolaus Copernicus Univ. (Poland); Olena Kovalenko, Vladyslav C. Usenko, Palacký Univ. Olomouc (Czech Republic)
5 September 2023 • 14:10 - 14:30 | E108

12740-8
Modulation variance optimization in discrete modulated CV-QKD systems
Author(s): Margarida Almeida, Armando N. Pinto, Univ. de Aveiro (Portugal), Instituto de Telecomunicações (Portugal); Nuno A. Silva, Instituto de Telecomunicações (Portugal)
5 September 2023 • 14:30 - 14:50 | E108

12740-9
Dark-field separation of optical modes in a thermal point source
Author(s): Si Ying Foo, National Univ. of Singapore (Singapore); Ming Zhi Koh, Xi Jie Yeo, Jae Suk Hwang, Ctr. for Quantum Technologies (Singapore); Christian Kurtsiefer, Ctr. for Quantum Technologies (Singapore), National Univ. of Singapore (Singapore); Peng Kian Tan, Ctr. for Quantum Technologies (Singapore)
5 September 2023 • 14:50 - 15:10 | E108

12740-10

Accurate doping profile extraction for predictive SPAD design

Author(s): Andrea Bonzi, Gabriele Laita, Ivan Rech, Angelo Gulinatti, Politecnico di Milano (Italy)

5 September 2023 • 15:10 - 15:30 | E108

Coffee Break 15:30 - 16:00

SESSION 3: NOVEL DEVICES

5 September 2023 • 16:00 - 17:20 | E108
Session Chair: Robert A. Lamb,
Leonardo MW Ltd. (United Kingdom)

12740-11

Fabrication of InGaAs/InP single-photon avalanche diodes for SWIR active imaging

Author(s): Frank Rutz, Andreas Woerl, Andreas Bächle, Jasmin Niemasz, Robert Rehm, Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany)

5 September 2023 • 16:00 - 16:20 | E108

12740-12

High-performance and low SWaP-C frequency comb for portable optical clock applications

Author(s): Alexander A. Lagatsky, Fraunhofer Ctr. for Applied Photonics (United Kingdom)

5 September 2023 • 16:20 - 16:40 | E108

12740-13

Optimization of a viable, wide-field-of-view, high angular resolution alpha-Z system in the visible spectrum for situational awareness

Author(s): Agnès Vinoy, Lab. Charles Fabry (France), Safran Reosc (France); Marie-Anne Burcklen, Yvan Sortais, Lab. Charles Fabry (France); Marc Ferrari, Observatoire de Haute-Provence, Institut Pythéas (France); Thierry Lépine, Lab. Hubert Curien (France); François Riguet, Roland Geyl, Jacques Rodolfo, Safran Reosc (France)

5 September 2023 • 16:40 - 17:00 | E108

12740-14

Efficient machine-learning approach to optimize trapped cold atom ensembles for quantum memory applications

Author(s): Ivan Sekulic, JCMwave GmbH (Germany); Philipp-Immanuel Schneider, JCMwave GmbH (Germany), Zuse Institute Berlin (Germany); Oliver Anton, Elisa Da Ros, Victoria Henderson, Humboldt-Univ. zu Berlin (Germany); Markus Krutzik, Humboldt-Univ. zu Berlin (Germany), Ferdinand-Braun-Institut (Germany)

5 September 2023 • 17:00 - 17:20 | E108

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12740-25

Analysis of the propagation of a short terahertz radio pulse through a medium with a negative permittivity

Author(s): Konstantin N. Klimov, Kirill I. Konov, Irina K. Epaneshnikova, Andrey M. Belevtsev, Moscow Aviation Institute (Russian Federation); Anton S. Boldyreff, Southern Federal Univ. (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12740-26

Investigation of the influence RF MEMS switch design on frequency characteristics

Author(s): Andrey M. Belevtsev, Irina K. Epaneshnikova, Ivan O. Dryagin, Moscow Aviation Institute (Russian Federation); Vasily L. Kryuchkov, Ioffe Institute (Russian Federation); Anton S. Boldyreff, Southern Federal Univ. (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

WEDNESDAY 6 SEPTEMBER 2023

SESSION 4: EMERGING DEVICES

6 September 2023 • 09:00 - 10:10 | E108
Session Chair: Neil A. Salmon,
MMW Sensors Ltd. (United Kingdom)

12740-19

Solid-state terahertz intensity modulator based on a single-layer graphene-metal metasurface *(Invited Paper)*

Author(s): Ruqiao Xia, Nikita W. Almond, Harvey E. Beere, David A. Ritchie, Wladislaw Michailow, Univ. of Cambridge (United Kingdom)

6 September 2023 • 09:00 - 09:30 | E108

12740-16

Metasurface-based mm-wave reflector lenses

Author(s): Chong Li, Mingyan Zhong, Yunan Jiang, Univ. of Glasgow (United Kingdom)

6 September 2023 • 09:30 - 09:50 | E108

12740-18

Investigation of the influence of antenna geometry on terahertz photoelectric tunable-step detector performance

Author(s): Ran Chen, Nikita W. Almond, Harvey E. Beere, David A. Ritchie, Wladislaw Michailow, Univ. of Cambridge (United Kingdom)

6 September 2023 • 09:50 - 10:10 | E108

Coffee Break 10:10 - 10:40

SESSION 5: NOVEL SENSORS AND PHENOMENOLOGY

6 September 2023 • 10:40 - 12:30 | E108

Session Chair: Neil A. Salmon,
MMW Sensors Ltd. (United Kingdom)

12740-15
Enabling polarization THz imaging using broadband dual-polarized SiGe HBT detectors *(Invited Paper)*
Author(s): Marcel Andree, Vishal S. Jagtap, Janusz Grzyb, Ullrich R. Pfeiffer, Institute for High-frequency and Communication Technology, Bergische Univ. Wuppertal (Germany)
6 September 2023 • 10:40 - 11:10 | E108

12740-17
A three-layer model for investigating the effect of clothing made of fleece, denim, and leather on the interaction of millimetre wave radiation on the skin
Author(s): Amani Yousef Owda, Arab American Univ. (Palestine, State of); Neil Salmon, MMW Sensors Ltd. (United Kingdom); Majdi Owda, Arab American Univ. (Palestine, State of)
6 September 2023 • 11:10 - 11:30 | E108

12740-20
High-resolution near-field DoA estimation using cooperative sensing system of MIMO radar modules with a commercial millimeter-wave CMOS-IC
Author(s): Hiroki Mori, Toshiba Corp. (Japan)
6 September 2023 • 11:30 - 11:50 | E108

12740-21
Propagation of Laguerre-Gaussian modes at millimeter-wave through scattering media
Author(s): Sebnem Dogru, Hakan Altan, Middle East Technical Univ. (Turkey); Asaf Behzat Sahin, Ankara Yildirim Beyazit Univ. (Turkey)
6 September 2023 • 11:50 - 12:10 | E108

12740-22
Fingertip blood-free noninvasive glucose monitoring using three-dimensional eye diagram analysis of terahertz wireless data
Author(s): Wonkyoung Lee, Sooyeon Kim, Eon Sang Kim, Heuk Park, Joon Ki Lee, Seung-Hyun Cho, Electronics and Telecommunications Research Institute (Republic of Korea)
6 September 2023 • 12:10 - 12:30 | E108

Conference 12741

Advanced Materials, Biomaterials, and Manufacturing Technologies for Security and Defence

3 - 5 September 2023 | E107

Conference Chairs: **Chantal Andraud,** Ecole Normale Supérieure de Lyon (France); **Roberto Zamboni,** Istituto per la Sintesi Organica e la Fotoreattività (Italy); **Attila Szep,** Air Force Research Lab. (United States); **Andrea Camposeo,** Istituto Nanoscienze (Italy); **Luana Persano,** Istituto Nanoscienze (Italy)

Programme Committee: **André-Jean Attias**, Univ. Pierre et Marie Curie (France); **Carrie M. Bartsch**, Air Force Research Lab. (United States); **Werner J. Blau**, Trinity College Dublin (Ireland); **Fabrice Charra**, Commissariat à l'Énergie Atomique (France); **Beata J. Derkowska**, Torun Univ. (Poland); **James G. Grote**, Air Force Research Lab. (United States); **Emily M. Heckman**, Air Force Research Lab. (United States); **François Kajzar**, Univ. Politehnica of Bucharest (Romania); **Loïc Mager**, Institut de physique et chimie des matériaux de Strasbourg (France); **Ana-Maria Manea-Saghin**, Univ. Politehnica of Bucharest (Romania); **Antoni C. Mitus**, Wroclaw Univ. of Technology (Poland); **Jaroslaw Mysliwiec**, Wroclaw Univ. of Technology (Poland); **Jacek Niziol**, AGH Univ. of Science and Technology (Poland); **Yoshiko Okada-Shudo**, The Univ. of Electro-Communications (Japan); **Fahima Ouchen**, Air Force Research Lab. (United States); **Agnieszka Pawlicka**, Instituto de Química de São Carlos (Brazil); **Luana Persano**, Istituto Nanoscienze (Italy); **Ullrich Pietsch**, Univ. Siegen (Germany); **Ileana Rau**, Univ. Politehnica of Bucharest (Romania); **Ifor D. W. Samuel**, Univ. of St. Andrews (United Kingdom); **Niyazi Serdar Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Kenneth D. Singer**, Case Western Reserve Univ. (United States)

SUNDAY 3 SEPTEMBER 2023

OPENING REMARKS

3 September 2023 • 14:00 - 14:10 | E107

Chantal Andraud, Ecole Normale Supérieure de Lyon (France)

Roberto Zamboni, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

Conference Chairs

SESSION 1: BIOTRONICS

3 September 2023 • 14:10 - 16:50 | E107

Session Chairs: Chantal Andraud, Ecole Normale Supérieure de Lyon (France), Roberto Zamboni, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

12741-1

Materials and methods for sustainable soft devices: from biodegradable tough gels to mycelium-based electronic skins *(Keynote Presentation)*

Author(s): Martin Kaltenbrunner, Johannes Kepler Univ. Linz (Austria)

3 September 2023 • 14:10 - 14:50 | E107

12741-2

Development of optical elements using original chalcogenide glass *(Invited Paper)*

Author(s): Yoshimasa Matsushita, Mitsuru Tomita, Fumio Sato, Noriaki Masuda, Nippon Electric Glass Co., Ltd. (Japan); Masafumi Kimata, Consultant (Japan)

3 September 2023 • 14:50 - 15:20 | E107

Coffee Break 15:20 - 15:50

12741-3

Upconverted emission in AC-driven electrochemiluminescent device with DNA modified electrodes *(Invited Paper)*

Author(s): Norihisa Kobayashi, Chiba Univ. (Japan)

3 September 2023 • 15:50 - 16:20 | E107

12741-4

High electromagnetic shielding effectiveness conductive nanoparticle-biopolymer composites *(Invited Paper)*

Author(s): James G. Grote, Michael M. Salour, SDXTek - Software Defined Technologies, Inc. (United States)

3 September 2023 • 16:20 - 16:50 | E107

MONDAY 4 SEPTEMBER 2023

SESSION 2: PHOTONICS, SMART MATERIALS

4 September 2023 • 09:00 - 11:30 | E107

Session Chairs: Chantal Andraud, Ecole Normale Supérieure de Lyon (France), Roberto Zamboni, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

12741-5

Preparation and photonics properties of 2D materials based on perylene diimide derivatives *(Invited Paper)*

Author(s): Nicolas Fabre, Remigiusz Trojanowicz, Laureen Moreaud, Simon Vassant, Céline Fiorini-Debuisschert, Fabrice Charra, CEA-Paris-Saclay (France)

4 September 2023 • 09:00 - 09:30 | E107

12741-6

High-capacity multilayer optical data storage media *(Invited Paper)*

Author(s): Irina Shiyanovskaya, Folio Photonics LLC (United States); Kenneth Singer, Folio Photonics LLC (United States), Case Western Reserve Univ. (United States)

4 September 2023 • 09:30 - 10:00 | E107

Coffee Break 10:00 - 10:30

12741-10

Nanofibers with properties configurable by external stimuli *(Invited Paper)*

Author(s): Luana Persano, Andrea Camposeo, Istituto Nanoscienze (Italy); Dario Pisignano, Univ. di Pisa (Italy)

4 September 2023 • 10:30 - 11:00 | E107

12741-22

Aza-BODIPY dyes for sensors optical protection in the SWIR band *(Invited Paper)*

Author(s): Chantal Andraud, Thibaut Baron, Sylvain David, Olivier Maury, Stéphane Parola, Ecole Normale Supérieure de Lyon (France); Denis Chateau, Mathym SAS (France); Gérard Berginc, Thales LAS France SAS (France)

4 September 2023 • 11:00 - 11:30 | E107

Lunch/Exhibition Break 11:30 - 13:10

SESSION 3: SENSORS

4 September 2023 • 13:10 - 15:20 | E107

Session Chairs: Chantal Andraud, Ecole Normale Supérieure de Lyon (France), Roberto Zamboni, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

12741-11

Fluorescence decay dynamics of exciplex formed in inert polymer films *(Invited Paper)*

Author(s): Yutaka Kawabe, Seiya Takabatake, Chitose Institute of Science and Technology (Japan)

4 September 2023 • 13:10 - 13:40 | E107

12741-12

All-organic and highly integrated fluorescence sensor enabled by the smart integration of organic optoelectronic and photonic components

Author(s): Emilia Benvenuti, Salvatore Moschetto, Marco Natali, Federico Prescimone, Istituto per lo Studio dei Materiali Nanostrutturati (Italy); Andrea Lanfranchi, Paola Lova, Univ. degli Studi di Genova (Italy); Marco Angelini, Optics for Life (Italy); Davide Comoretto, Univ. degli Studi di Genova (Italy); Margherita Bolognesi, Mario Prosa, Stefano Toffanin, Istituto per lo Studio dei Materiali Nanostrutturati (Italy)

4 September 2023 • 13:40 - 14:00 | E107

12741-8

Solution processed hybrid photototransistors with unconventional tri-channel geometry for highly sensitive detection of vis and near-infrared light

Author(s): Margherita Bolognesi, Federico Prescimone, Istituto per lo Studio dei Materiali Nanostrutturati (Italy); Wejdan S. Al Ghamdi, King Abdullah Univ. of Science and Technology (Saudi Arabia); Giulia Baroni, Marco Natali, Istituto per lo Studio dei Materiali Nanostrutturati (Italy); Thomas Anthopoulos, King Abdullah Univ. of Science and Technology (Saudi Arabia); Stefano Toffanin, Istituto per lo Studio dei Materiali Nanostrutturati (Italy)

4 September 2023 • 14:00 - 14:20 | E107

12741-13

A miniaturized biosensor based on organic optoelectronics for fast and multiplexing plasmonic detection of high- and low-molecular weight analytes *(Invited Paper)*

Author(s): Stefano Toffanin, Istituto per lo Studio dei Materiali Nanostrutturati (Italy)

4 September 2023 • 14:20 - 14:50 | E107

12741-14

A large-size position sensitive detector based on photoreceptor protein and conductive polymer *(Invited Paper)*

Author(s): Yoshiko Okada-Shudo, Arashi Shirota, The Univ. of Electro-Communications (Japan)

4 September 2023 • 14:50 - 15:20 | E107

Coffee Break 15:20 - 16:00

ADJOURN

4 September 2023 • 15:20 - 15:30 | E107

Chantal Andraud, Ecole Normale Supérieure de Lyon (France)

Roberto Zamboni, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

Conference Chairs

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)

4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)

4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)

4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

WELCOME

5 September 2023 • 09:00 - 09:05 | E107

Andrea Camposeo, Istituto Nanoscienze (Italy)

Luana Persano, Istituto Nanoscienze (Italy)

Conference Chair

SESSION 4: ADVANCED MANUFACTURING TECHNOLOGIES FOR MICRO- AND NANOSYSTEMS I

5 September 2023 • 09:05 - 10:10 | E107

Session Chair: Luana Persano, Istituto Nanoscienze (Italy)

12741-24

Laser-assisted fabrication of 3D engineered cell microenvironments: the new era of mechanobiology *(Keynote Presentation)*

Author(s): Jun Chen, UCLA Samueli School of Engineering (United States)

5 September 2023 • 09:05 - 09:40 | E107

12741-16

Electro-active soft materials for robots and wearables *(Invited Paper)*

Author(s): Vito Cacucciolo, Politecnico di Bari (Italy)

5 September 2023 • 09:40 - 10:10 | E107

Coffee Break 10:10 - 10:40

SESSION 5: ADVANCED MANUFACTURING TECHNOLOGIES FOR MICRO- AND NANOSYSTEMS II

5 September 2023 • 10:40 - 11:50 | E107

Session Chair: Luana Persano, Istituto Nanoscienze (Italy)

12741-17

3D Printing of nano- and micro-fabricated components to enable compact snapshot imaging spectrometers: analysis of design strategies and fabrication space
(Invited Paper)

Author(s): Tomasz S. Tkaczyk, Christopher Flynn, Haimu Cao, Jiawei Lu, Yicheng Ma, Rice Univ. (United States)

5 September 2023 • 10:40 - 11:10 | E107

12741-18

Processing routes for tunable structural color

Author(s): Mark Griep, DEVCOM Army Research Lab. (United States)

5 September 2023 • 11:10 - 11:30 | E107

12741-23

Optical and manufacturing design aware flow for metalenses

Author(s): Maryvonne Chalony, Synopsys, Inc. (France); Bernd Küchler, Rainer Zimmermann, Synopsys GmbH (Germany); Chenglin Xu, Lawrence S. Melvin, Emilie Viasnoff, Synopsys, Inc. (United States)

5 September 2023 • 11:30 - 11:50 | E107

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

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Poster Setup: Tuesday 10:00 – 17:00 hrs

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12741-21

Experimental study on the interaction between millisecond pulsed laser and aluminum alloy materials

Author(s): Hongrui Wang, Lei Gong, AVIC Manufacturing Technology Institute (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference 12742

Artificial Intelligence for Security and Defence Applications

4 - 5 September 2023 | D202

Conference Chairs: **Henri Bouma,** TNO (Netherlands); **Judith Dijk,** TNO (Netherlands); **Radhakrishna Prabhu,** The Robert Gordon Univ. (United Kingdom); **Robert James Stokes,** Agilent Technologies (United Kingdom); **Yitzhak Yitzhaky,** Ben-Gurion Univ. of the Negev (Israel)

Programme Committee: **Hakan Altan,** Middle East Technical Univ. (Turkey); **Maria Andersson**; FOI-Swedish Defence Research Agency (Sweden); **Stefan Becker**; Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Felicity Carlysle-Davies**; Univ. of Strathclyde (United Kingdom); **Brian E. Foulger**; Ministry of Defence (United Kingdom); **Gennadii E. Kotkovskii**; National Research Nuclear Univ. MEPhI (Russian Federation); **Gillian F. Marshall**; QinetiQ Ltd. (United Kingdom); **David Muench**; Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); **Niamh Nic Daeid**; Univ. of Dundee (United Kingdom); **Salman Rosenwaks**; Ben-Gurion Univ. of the Negev (Israel); **Andre Samberg**; i4-Flame OÜ (LLC) (Estonia); **Neil C. Shand**; Defence Science and Technology Lab. (United Kingdom); **Berkan Solmaz**; ASELSAN A.S. (Turkey); **Piotr Szynkarczyk**; Industrial Research Institute for Automation and Measurements (Poland); **Paul A. Thomas**; Defence Science and Technology Lab. (United Kingdom)

MONDAY 4 SEPTEMBER 2023

SESSION 1: PRIVACY, IDENTIFICATION AND RECOGNITION

4 September 2023 • 08:40 - 10:00 | D202
Session Chairs: Henri Bouma, TNO (Netherlands), Radhakrishna Prabhu, The Robert Gordon Univ. (United Kingdom)

12742-1
Efficient storage and retrieval of high-quality face images for effective face recognition
Author(s): Sefa Burak Okcu, Utku Sari, Cevahir Çigla, ASELSAN A.S. (Turkey)
4 September 2023 • 08:40 - 09:00 | D202

12742-2
To what extent are color and texture effective in person re-identification
Author(s): Bahadir Akdemir, Ihsan Emre Üstün, Fatih Simsek, Cevahir Çigla, ASELSAN A.S. (Turkey)
4 September 2023 • 09:00 - 09:20 | D202

12742-3
Privacy-preserving federated learning with various computer-vision tasks for security applications
Author(s): Sabina B. van Rooij, Muriel van der Spek, Arthur van Rooijen, Henri Bouma, TNO (Netherlands)
4 September 2023 • 09:20 - 09:40 | D202

12742-4
Vehicle color recognition using instance segmentation
Author(s): Ihsan Emre Üstün, Cevahir Çigla, ASELSAN A.S. (Turkey)
4 September 2023 • 09:40 - 10:00 | D202

Coffee Break 10:10 - 10:40

SESSION 2: SURVEILLANCE

4 September 2023 • 10:40 - 12:00 | D202
Session Chairs: Yitzhak Yitzhaky, Ben-Gurion Univ. of the Negev (Israel), Robert James Stokes, Agilent Technologies (United Kingdom)

12742-5
Efficient visual information indexation for supporting actionable intelligence and knowledge generation
Author(s): Desale Nurye, Yagmur Aktas, Jorge García, Vicomtech (Spain)
4 September 2023 • 10:40 - 11:00 | D202

12742-6
Efficient depth localization of objects in a 3D space using computational integral imaging
Author(s): Yitzhak Yitzhaky, Michael Kadosh, Anton Fraiman, Ben-Gurion Univ. of the Negev (Israel)
4 September 2023 • 11:00 - 11:20 | D202

12742-7
Identification of explosives, precursors and flash powders through barriers with Raman SORS technology
Author(s): Samuel F. Williams, The Univ. of Sheffield (United Kingdom); Ana M. Blanco-Rodriguez, Samantha Walker, Agilent Technologies UK Ltd. (United Kingdom); Robert J. Stokes, Agilent Technologies (United Kingdom)
4 September 2023 • 11:20 - 11:40 | D202

12742-8
Fuzzy logic, edge enabled underwater video surveillance through partially wireless optical communication
Author(s): Radhakrishna Prabhu, Craig Stewart, Nazila Fough, The Robert Gordon Univ. (United Kingdom)
4 September 2023 • 11:40 - 12:00 | D202

Lunch/Exhibition Break 12:00 - 13:40

SESSION 3: DETECTION AND TRACKING

4 September 2023 • 13:40 - 15:00 | D202
Session Chairs: Radhakrishna Prabhu,
The Robert Gordon Univ. (United Kingdom), Yitzhak Yitzhaky,
Ben-Gurion Univ. of the Negev (Israel)

12742-9

Infrared maritime moving target detection via spatial-multiscale DMD

Author(s): Osvaldo Pulpito, Giovanni Martella, Nicola Acito, Marco Diani, Giovanni Corsini, Univ. di Pisa (Italy); Raffaele Grasso, Gabriele Ferri, Kevin LePage, STO-CMRE (Italy)
4 September 2023 • 13:40 - 14:00 | D202

12742-11

Detecting and tracking the position of suspicious objects using vision system

Author(s): Ramkumar Muthukrishnan, Somasundar Kannan, Radhakrishna Prabhu, Yafan Zhao, The Robert Gordon Univ. (United Kingdom); Parijat Bhowmick, Indian Institute of Technology Kharagpur (India)
4 September 2023 • 14:00 - 14:20 | D202

12742-12

Center point-based feature representation for tracking

Author(s): Stefan Becker, Ronny Hug, Wolfgang Hübner, Michael Arens, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)
4 September 2023 • 14:20 - 14:40 | D202

12742-13

One-shot logo detection for large video datasets and live camera surveillance in criminal investigations

Author(s): Stefanos Demertzis, Ctr. for Research and Technology Hellas, Visual Computing Lab. (Greece); Sabina B. van Rooij, TNO (Netherlands); Michalis Lazaridis, Ctr. for Research and Technology Hellas, Visual Computing Lab. (Greece); Henri Bouma, TNO (Netherlands); Manuel Alvarez Fernandez, Policía Nacional España (Spain); Johan-Martijn ten Hove, TNO (Netherlands); Rodrigo Sainz Mendez, Policía Nacional España (Spain); Petros Daras, Ctr. for Research and Technology Hellas, Visual Computing Lab. (Greece)
4 September 2023 • 14:40 - 15:00 | D202

Coffee Break 15:00 - 16:00

SENSORS + IMAGING PLENARY SESSION

4 September 2023 • 16:00 - 18:15 | Forum

Welcome and Introduction

16:00 to 16:10 hrs

12738-500

A Dutch perspective on space situational awareness (SSA) for defence *(Plenary Presentation)*

Author(s): Marko Noppen, Defence Space Security Ctr., MoD (Netherlands); Ivan Ferrario, TNO (Netherlands)
4 September 2023 • 16:10 - 16:55 | Forum

12742-600

Meaningful control of intelligent systems *(Plenary Presentation)*

Author(s): Peter Werkhoven, TNO (Netherlands)
4 September 2023 • 16:55 - 17:40 | Forum

12729-700

The ESA Earth Observation Programme: highlights, opportunities and challenges *(Plenary Presentation)*

Author(s): Nicolaus Hanowski, ESRIN (Italy)
4 September 2023 • 17:40 - 18:25 | Forum

TUESDAY 5 SEPTEMBER 2023

SESSION 4: OBJECT DETECTION AND TRACKING

5 September 2023 • 09:00 - 10:10 | D202
Session Chair: Judith Dijk, TNO (Netherlands)

12742-14

Bio-inspired enhancement for optical detection of drones using convolutional neural networks *(Invited Paper)*

Author(s): Salil Luesutthiviboon, Guido de Croon, Anique Altena, Mirjam Snellen, Technische Univ. Delft (Netherlands); Mark Voskuijl, Netherlands Defence Academy (Netherlands)
5 September 2023 • 09:00 - 09:30 | D202

12742-16

Influence of different image acquisition sources on the performances of a CNN-based object detector

Author(s): Nicolas Hueber, Alexander Pichler, Institut Franco-Allemand de Recherches de Saint-Louis (France)
5 September 2023 • 09:30 - 09:50 | D202

12742-17

Leveraging temporal context in deep learning methodology for small object detection

Author(s): Friso G. Heslinga, Frank A. Ruis, Luca Ballan, Martin C. van Leeuwen, Beatrice Masini, Richard J. M. den Hollander, Judith Dijk, Wyke Pereboom-Huizinga, TNO (Netherlands)
5 September 2023 • 09:50 - 10:10 | D202

Coffee Break 10:10 - 10:40

SESSION 5: EXPLAINABILITY

5 September 2023 • 10:40 - 11:20 | D202
Session Chair: Judith Dijk, TNO (Netherlands)

12742-18

Swiss army VAE: comprehensive sensor data analysis via explainable AI

Author(s): John Helmsen, Brian Baracat-Donovan, Riley White, Thomas McCullough, Noblis, Inc. (United States)
5 September 2023 • 10:40 - 11:00 | D202

12742-19

New methods for explainable variational autoencoders

Author(s): Brian Baracat-Donovan, Riley White, John Helmsen, Thomas McCullough, Noblis, Inc. (United States)
5 September 2023 • 11:00 - 11:20 | D202

SESSION 6: ACTIVE LEARNING

5 September 2023 • 11:20 - 12:20 | D202
Session Chair: Judith Dijk, TNO (Netherlands)

12742-20

Ship Detection in Thermal Infrared using Paired Visible Light Images and Domain Adaptation via Knowledge Distillation

Author(s): Jorge G. O. Melo, Luca Ballan, Bas van den Broek, Judith Dijk, Wyke Pereboom-Huizinga, Arta Dilo, Jan Baan, TNO (Netherlands)
5 September 2023 • 11:20 - 11:40 | D202

12742-21

Low-budget active learning for SAR computer vision

Author(s): Martin Jaszewski, Jonathan K. Sato, Julian Y. Raheema, Naval Information Warfare Ctr. Pacific (United States)

5 September 2023 • 11:40 - 12:00 | D202

12742-22

Aerial image segmentation with minimal annotation effort using clustering of pretrained embeddings

Author(s): Sabina van Rooij, Maarten C. Kruithof, Wyke Huizinga, Gertjan Burghouts, Klamer Schutte, TNO (Netherlands)

5 September 2023 • 12:00 - 12:20 | D202

Lunch/Exhibition Break 12:20 - 14:00

SESSION 7: IMAGE ENHANCEMENT

5 September 2023 • 14:00 - 14:30 | D202
Session Chair: Judith Dijk, TNO (Netherlands)

12742-35

Imaging for autonomous systems *(Invited Paper)*

Author(s): Judith Dijk, TNO (Netherlands)

5 September 2023 • 14:00 - 14:30 | D202

SESSION 8: SIMULATION AND SYNTHETIC DATA

5 September 2023 • 14:30 - 16:40 | D202
Session Chair: Judith Dijk, TNO (Netherlands)

12742-26

The effect of simulation variety on a deep learning-based military vehicle detector

Author(s): Thijs A. Eker, Friso G. Heslinga, Luca Ballan, Richard J. M. den Hollander, Klamer Schutte, TNO (Netherlands)

5 September 2023 • 14:30 - 14:50 | D202

12742-27

Synthetic thermal imagery for UAV reconnaissance by change detection

Author(s): Eva Strauß, Dimitri Bulatov, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Peter Stütz, Univ. der Bundeswehr München (Germany)

5 September 2023 • 14:50 - 15:10 | D202

Coffee Break 15:10 - 15:40

12742-28

Impact study on MuSES-generated EO/IR synthetic imagery for machine learning algorithm development

Author(s): Corey D. Packard, Mark D. Klein, Alex J. Klaschus, ThermoAnalytics, Inc. (United States); Zachary J. Edel, ThermoAnalytics (United States); Jacob N. Hendrickson, Eli J. Datema, Scott C. Gibbs, Peter L. Rynes, ThermoAnalytics, Inc. (United States)

5 September 2023 • 15:40 - 16:00 | D202

12742-29

Improving object detector training on synthetic data by starting with a strong baseline methodology

Author(s): Frank A. Ruis, Richard J. M. den Hollander, Friso G. Heslinga, Luca Ballan, Martin C. van Leeuwen, Beatrice Masini, Judith Dijk, Wyke Pereboom-Huizinga, TNO (Netherlands)

5 September 2023 • 16:00 - 16:20 | D202

12742-30

Predicting DNN classification performance on degraded imagery

Author(s): Richard J. M. den Hollander, Lotte Nijskens, Jorge G. O. Melo, Frank P. A. Benders, Klamer Schutte, TNO (Netherlands)

5 September 2023 • 16:20 - 16:40 | D202

POSTERS-TUESDAY

5 September 2023 • 17:15 - 19:00 | Elicium Hall

Conference attendees are invited to attend the Sensors + Imaging poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Tuesday 10:00 – 17:00 hrs

View poster presentation guidelines and set-up instructions at **https://spie.org/ESI/poster-presentation-guidelines**

12742-31

Air sampling device based on cyclone collector with immunochromatographic analysis module

Author(s): Gennadii E. Kotkovskii, Alexander A. Chistyakov, Artem E. Akmalov, Evgeniy V. Osipov, Yury A. Kuzishchin, Igor L. Martynov, Sergey K. Belenok, National Research Nuclear Univ. MEPhI (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12742-32

Immunofluorescence module for liquid biopathogen analysis in an aerosol sampler

Author(s): Gennadii E. Kotkovskii, Alexander A. Chistyakov, Artem E. Akmalov, Sergey K. Belenok, National Research Nuclear Univ. MEPhI (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12742-33

Vacuum interface with a high ion transmission ratio from a laser ion mobility spectrometer to a mass spectrometer for the detection of low-volatile organic substances

Author(s): Gennadii E. Kotkovskii, Alexander A. Chistyakov, Artem E. Akmalov, Kirill N. Lavrinenko, National Research Nuclear Univ. MEPhI (Russian Federation)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12742-34

A logistic regression algorithm-based method for the evaluation of laser atmospheric transmission

Author(s): Sifan Wang, Yi Wang, AVIC Manufacturing Technology Institute (China)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12742-36

Sequentially-trained, shallow neural networks for real-time odometry and object tracking

Author(s): Luat T. Vuong, Frank Rodriguez, Baurzhan Muminov, Univ. of California, Riverside (United States)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

12742-37

Evaluation of performance of an active terahertz imaging system for concealed face recognition

Author(s): Ihsan Ozan Yildirim, Hakan Altan, Middle East Technical Univ. (Turkey); Asaf Behzat Sahin, Ankara Yildirim Beyazit Univ. (Turkey); Sebnem Dogru, Middle East Technical Univ. (Turkey)

5 September 2023 • 17:15 - 19:00 | Elicium Hall

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The connect feature in the SPIE Conference App is a personal networking tool that allows individuals to share their contact information with other attendees via their phones while using the SPIE app. This tool should not be used for systematic scanning of badges for managing sales leads. Inappropriate use is a violation of event policy.

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The lead retrieval feature in the SPIE Conferences App is a lead generation tool that allows attendees to share their contact information with SPIE exhibitors. Exhibitor Representatives using the lead retrieval app may scan attendee badges in the exhibition or supporting company events after receiving permission from an attendee. It should not be used in the technical conference area. The lead retrieval feature will be disabled for exhibitor representatives who exceed reasonable use or are in violation of other SPIE event policies. Attendees should report inappropriate use by notifying staff or contacting support via the help link in the app.

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If for some unforeseen reason SPIE should have to cancel an event or course, processed registration fees will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

Family-friendly policy

Conference events: All conference technical and networking events require a badge for admission. Registered attendees may bring children with them if they have been issued a badge. Registration badges for children under 18 are free and available at the SPIE registration desk onsite. Children under 14 years of age must be accompanied by an adult at all times, and guardians are asked to help maintain a professional, disturbance-free conference environment.

Exhibition hall: Everyone who attends the exhibition must be registered and have a badge. Badges for children are free and available onsite at the registration desk. Children under 14 years of age must be accompanied by an adult at all times. Guardians are asked to help maintain a professional, disturbance-free exhibition environment. Children under 18 are not allowed in the exhibition area during exhibition move-in and move-out.

Identification requirement

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued photo identification at registration to collect registration materials. Individuals are not allowed to pick up badges for other attendees. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

For online events, SPIE requires individuals to register with their legal identity.

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No smoking policy

Attendees will observe all non-smoking regulations that are publicly posted by the facilities used by the event.

Online commenting policy

SPIE moderates all comments posted in an online event. We encourage robust discussion, the exchange of scientific ideas, and the sharing of multiple, diverse perspectives. We expect the discussion to be consistent with the norms of scholarly research community interactions at events. Online event participants should report any comments or content that falls short of those community norms. We will remove comments, content, or people that are considered inappropriate by SPIE standards or that:

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- infringe the copyright, trademark, or other rights of a third party
- upload viruses or are a cybersecurity hazard
- are off topic or inappropriately commercial in nature
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Courses: Audio and video recordings are prohibited without explicit permission from SPIE and the instructor. Individuals not complying with this policy will be asked to surrender their recording media and to leave the classroom. Refusal to comply with such requests is grounds for expulsion from the event.

Exhibition: Attendees may not record interviews on the exhibition floor nor record or photograph exhibitor booth displays and/or products without explicit permission from SPIE and on-site company representatives. Consent forms are available at Exhibitor Assistance. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall. Refusal to comply with such requests is grounds for expulsion from the event.

Unauthorized solicitation

Unauthorized solicitation in the exhibition hall is prohibited. Any non-exhibiting organization observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

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Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

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