PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 9639

, "Front Matter: Volume 9639," Proc. SPIE 9639, Sensors, Systems, and Next-Generation Satellites XIX, 963901 (20 October 2015); doi:
10.1117/12.2220465

SPIE.

Event: SPIE Remote Sensing, 2015, Toulouse, France

PROCEEDINGS OF SPIE

Sensors, Systems, and Next-Generation Satellites XIX

Roland Meynart
Steven P. Neeck
Haruhisa Shimoda
Toshiyoshi Kimura
Editors

21–24 September 2015
Toulouse, France

Sponsored by
SPIE

Cooperating Organisations
European Association of Remote Sensing Companies (Belgium)
European Optical Society
CENSIS—Innovation Centre for Sensor & Imaging Systems (United Kingdom)
EARSeL—European Association of Remote Sensing Laboratories
Optitec (France)
Route des Lasers (France)

Published by
SPIE

Volume 9639

Proceedings of SPIE 0277-786X, V. 9639

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

Sensors, Systems, and Next-Generation Satellites XIX, edited by Roland Meynart, Steven P. Neeck, Haruhisa Shimoda, Toshiyoshi Kimura, Proc. of SPIE Vol. 9639, 963901 · © 2015 SPIE
CCC code: 0277-786X/15/\$18 · doi: 10.1117/12.2220465

Proc. of SPIE Vol. 9639 963901-1

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Sensors, Systems, and Next-Generation Satellites XIX*, edited by Roland Meynart, Steven P. Neeck, Haruhisa Shimoda, Toshiyoshi Kimura, Proceedings of SPIE Vol. 9639 (SPIE, Bellingham, WA, 2015) Six-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781628418491

Published by

SPIE

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

Telephone +1 360 676 3290 (Pacific Time) • Fax +1 360 647 1445

SPIE.org

Copyright © 2015, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/15/\$18.00.

Printed in the United States of America.

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

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a six-digit CID article numbering system structured as follows:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

ix	<i>Authors</i>
xiii	<i>Conference Committee</i>

SESSION 1	EUROPEAN MISSIONS
9639 03	The flexible combined imager onboard MTG: from design to calibration [9639-2]
9639 04	CNES Cal/Val expertise centre for Sentinel-2 in orbit tests (TEC-S2): architecture and data processing [9639-3]
9639 05	Sentinel-2 radiometric image quality commissioning: first results [9639-4]
9639 06	Sentinel-2/MSI absolute calibration: first results [9639-5]
SESSION 2	US MISSIONS
9639 07	The NASA Earth Science Flight Program: an update (Invited Paper) [9639-6]
9639 08	Landsat 8: status and on-orbit performance [9639-7]
SESSION 3	JAPANESE MISSIONS I
9639 0B	Overview of Japanese Earth observation programs (Invited Paper) [9639-10]
9639 0D	ALOS-2 initial results [9639-13]
9639 0E	On-orbit performance of the Compact Infrared Camera (CIRC) onboard ALOS-2 [9639-14]
SESSION 4	JAPANESE MISSIONS II
9639 0G	Current status of the dual-frequency precipitation radar on the Global Precipitation Measurement core spacecraft [9639-16]
9639 0H	EarthCARE/CPR design results and PFM development status [9639-17]
9639 0I	Development and pre-launch test status of Second Generation Global Imager (SGLI) [9639-18]

SESSION 5	JAPANESE MISSIONS III
9639 OK	Concept study of a vegetation lidar on International Space Station [9639-20]
9639 OM	Sensitivity study of SMILES-2 for chemical species [9639-22]
9639 ON	Measurement of stratospheric and mesospheric winds with a submillimeter wave limb sounder: results from JEM/SMILES and simulation study for SMILES-2 [9639-23]
SESSION 6	FOCAL PLANE ASSEMBLIES I
9639 OO	Visible and infrared detector developments supported by the European Space Agency [9639-24]
9639 OP	Low dark current MCT-based focal plane detector arrays for the LWIR and VLWIR developed at AIM [9639-25]
9639 OR	NGP: a new large format infrared detector for observation, hyperspectral and spectroscopic space missions in VISIR, SWIR and MWIR wavebands [9639-27]
9639 OS	Multiband CMOS sensor simplify FPA design [9639-28]
SESSION 7	FOCAL PLANE ASSEMBLIES II
9639 OT	A 400 KHz line rate 2048-pixel modular SWIR linear array for earth observation applications [9639-29]
9639 OU	Sensor system development for the WSO-UV (World Space Observatory Ultraviolet) space-based astronomical telescope [9639-30]
9639 OV	InAs photodiode for low temperature sensing [9639-31]
9639 OW	Extended scene wavefront sensor for space application [9639-32]
9639 OX	First characterization of the NIR European Large Format Array detectors tested at ESTEC [9639-87]
SESSION 8	CALIBRATION I
9639 OY	Comparison of S-NPP VIIRS and PLEIADES lunar observations [9639-33]
9639 OZ	A summary of the joint GSICS – CEOS/IVOS lunar calibration workshop: moving towards intercalibration using the Moon as a transfer target [9639-35]
9639 10	Assessment of MODIS on-orbit spatial performance [9639-36]
9639 11	Cross-calibration of the reflective solar bands of Terra MODIS and Landsat 7 Enhanced Thematic Mapper plus over PICS using different approaches [9639-37]

9639 12 **Vicarious calibration of KOMPSAT-3 AEISS [9639-46]**

SESSION 9 CALIBRATION II

9639 13 **Evaluation of VIIRS and MODIS thermal emissive band calibration consistency using Dome C [9639-38]**

9639 14 **Tracking Terra MODIS on-orbit polarization sensitivity using pseudo-invariant desert sites [9639-39]**

9639 15 **Radiometric calibration and performance trends of the Clouds and Earth's Radiant Energy System (CERES) instrument sensors onboard the Aqua and Terra spacecraft [9639-40]**

9639 17 **The GOES-R Advanced Baseline Imager: detector spectral response effects on thermal emissive band calibration [9639-42]**

SESSION 10 CALIBRATION III

9639 18 **Selenographic coordinate mapping of lunar observations by GOES imager [9639-43]**

9639 19 **Preparation of a new autonomous instrumented radiometric calibration site: Gobabeb, Namib Desert [9639-44]**

SESSION 11 CALIBRATION IV

9639 1C **The Traceable Radiometry Underpinning Terrestrial and Helio Studies (TRUTHS) mission [9639-48]**

9639 1D **Creation and validation of Spectralon BRDF targets and standards [9639-49]**

9639 1E **China radiometric calibration sites ground-based automatic observing systems for CAL/VAL [9639-50]**

SESSION 12 MISSIONS AND TECHNOLOGIES I

9639 1F **Deployment simulation of a deployable reflector for Earth science application [9639-53]**

SESSION 13 MISSIONS AND TECHNOLOGIES II

9639 1G **Radiometric uncertainty per pixel for the Sentinel-2 L1C products [9639-54]**

9639 1H **G-MAP: a novel night vision system for satellites [9639-55]**

9639 1I **Photonic front-end for the next generation of space SAR applications [9639-56]**

9639 1J **Two conceptual designs for optical system of next-generation small satellites [9639-57]**

SESSION 14	MISSIONS AND TECHNOLOGIES III
9639 1M	Visible spectral imager for occultation and nightglow (VISION) for the PICASSO Mission [9639-61]
9639 1N	The ESA RADGLASS activity: a radiation study of non rad-hard glasses [9639-62]
SESSION 15	MISSIONS AND TECHNOLOGIES IV
9639 1P	A new service support tool for COSMO-SkyMed: civil user coordination service and civil request management optimization [9639-65]
9639 1Q	The COSMO-SkyMed ground and ILS and OPS segments upgrades for full civilian capacity exploitation [9639-66]
9639 1R	OPTIMA: advanced methods for the analysis, integration, and optimization of PRISMA mission products [9639-67]
SESSION 16	MISSIONS AND TECHNOLOGIES V
9639 1S	Visible and near-infrared imaging spectrometer (VNIS) for in-situ lunar surface measurements [9639-68]
	POSTER SESSION
9639 1W	Overview of test and application of the multispectral camera on ZY-3 satellite [9639-51]
9639 1X	ASTER 15 years challenging trail on-orbit operation [9639-73]
9639 1Z	ASTER system operating achievement for 15 years on orbit [9639-75]
9639 20	Comparison of different water infrared emissivity retrieval methods with the theoretical model [9639-76]
9639 21	Auroral activities observed by SNPP VIIRS day/night band during a long period geomagnetic storm event on April 29-30, 2014 [9639-77]
9639 22	An improved method of fuzzy support degree based on uncertainty analysis [9639-78]
9639 24	Rugged: an operational, open-source solution for Sentinel-2 mapping [9639-80]
9639 25	Pixel partition method using Markov random field for measurements of closely spaced objects by optical sensors [9639-81]
9639 26	Calibration of the videospectral system for the space experiment "Uragan" onboard the ISS [9639-82]

- 9639 27 **Monte Carlo-based multiphysics coupling analysis of x-ray pulsar telescope** [9639-83]
- 9639 28 **Application of high-precision matching about multi-sensor in fast stereo imaging** [9639-84]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Adibi, S. A., 1J	Cooksey, Catherine, 1D
Ahmad, Munadi, 1N	Corlay, Gilles, 0W
Ahn, Hoyong, 12	Costantino, Alessandra, 1N
Aiazzi, Bruno, 1R	Crouzet, P.-E., 0O, 0X
Aida, Yoshihisa, 0H	Daraio, M. G., 1P, 1Q
Akagi, Shigeki, 1X, 1Z	Deep, Atul, 1N
Alparone, Luciano, 1R	Dekemper, Emmanuel, 1M
Amano, Takahiro, 0I	Delannoy, Anne, 0R
Aminou, Donny, 03	De Luca, G. F., 1Q
Amorim, Emmanuel, 1N	Demoulin, Philippe, 1M
An, Wei, 25	Deng, Loulou, 27
Ananasso, Cristina, 1R	Deroo, Pieter, 0T
Anchlia, Ankur, 0T	de Wit, F., 0X
Angal, Amit, 11, 14	Du, Qinfeng, 25
Arvidson, Terry, 08	Durand, Yannig, 03
Aznay, Ouahid, 0Y	Durell, Christopher, 1D
Ba, Xiutian, 1E	Duvet, L., 0O, 0X
Bai, Yan, 20	Eich, Detlef, 0P
Barducci, Alessandro, 1R	Espeset, Aude, 24
Baron, Philippe, 0M, 0N	Fan, Bin, 1W
Baronti, Stefano, 1R	Fang, Houfei, 1F
Barsi, Julia A., 08	Farges, M., 05
Battagliere, M. L., 1P	Fasano, L., 1P, 1Q
Beaufort, T., 0X	Fick, Wolfgang, 0P
Beliaev, Boris, 26	Fièrque, Bruno, 0R
Berthelot, Béatrice, 19	Figgemeier, Heinrich, 0P
Bézy, Jean-Loup, 0O, 1N	Fougnie, Bertrand, 06, 0Y, 0Z
Bialek, Agnieszka, 19	Fox, Nigel P., 19, 1C, 1G
Blommaert, S., 0X	Friend, Jonathan, 1C
Blythe, Paul, 03	Fulbright, Jon, 0Y
Bomer, Thierry, 0W	Fung, Shing F., 21
Bouvet, Marc, 19	Furukawa, K., 0G
Brinkmann, Jake, 11, 13	Fussen, Didier, 1M
Butler, B., 0X	Gamet, P., 05, 06
Cai, Bei, 1F	Garzelli, Andrea, 1R
Cai, Weijun, 1W	Gascon, Ferran, 1G
Canaud, Jean-Louis, 03	Gassmann, Kai Uwe, 0P
Cao, Changyong, 17, 21	Geng, Xu, 14
Cardone, M., 1Q	Georgiev, Georgi, 1D
Carlà, Roberto, 1R	Gielen, Daphne, 0T
Catalani, A., 1I	Gong, Fang, 20
Chen, Jianyu, 20	Gorroño, Javier, 1G
Chmielak, B., 1I	Grabarnik, Semen, 03
Choate, Mike, 08	Green, Paul D., 1C
Choi, Chuluong, 12	Greenwell, Claire, 19
Chorier, Philippe, 0R	Guinet, Jonathan, 24
Ciapponi, A., 0O	Guzzi, Donatella, 1R
Clapp, Matthew, 0U	Hallibert, Pascal, 03
Coletta, A., 1P	Hanado, H., 0G

Hanna, Stefan, 0P	Markham, Brian L., 08
Hayes-Thakore, Chris, 0U	Marks, Amelia, 19
He, Xianqiang, 20	Martenov, Anton, 26
He, Zhiping, 1S	Maruyama, Kenta, 0H
Heijnen, J., 0X	Masaki, T., 0G
Helder, Dennis, 11	McKee, Greg, 1D
Hewison, T., 0Z	Mei, Zhiwu, 27
Holmlund, Christer, 1M	Mengual, T., 1I
Hooylaerts, Peter, 0T	Merken, Patrick, 0T
Horie, Hiroaki, 0H	Meygret, Aimé, 19
Hosokawa, Tamiki, 0I	Meynart, Roland, 0O, 1N
Hu, Xiuqing, 1E	Miletti, Thomas, 1H
Huang, Yuan, 22	Minoglou, K., 0O
Huggard, P., 1I	Miranda, Micael D., 1N
Iguchi, T., 0G	Mishra, Nischal, 11
Imai, T., 0K	Montanaro, Matt, 08
Inada, Hitomi, 1X, 1Z	Morfitt, Ron, 08
Irimajiri, Yoshihisa, 0N	Murooka, J., 0K
Irons, James R., 08	Murtagh, Donal, 0N
Ishii, Yasuyuki, 0H	Nakajima, Yasuhiro, 0E
Ito, Yoshiyuki, 1X, 1Z	Nakatsuka, Hirotaka, 0H
Jin, Cheonggil, 12	Nakau, Koji, 0E
Kankaku, Yukihiko, 0D	Näkki, Ismo, 1M
Karami, A., 1J	Napierala, Bruno, 03
Katayama, Haruyoshi, 0E	Nardino, Vanni, 1R
Katkovsky, Leonid, 26	Näsilä, Antti, 1M
Kato, Eri, 0E	Neeck, Steven P., 07
Kikuchi, Masakuni, 1X, 1Z	Nelms, N., 0O
Kim, Jinsoo, 12	Ng, J. S., 0V
Kimura, Toshiyoshi, 0E, 0K	Nio, T., 0G
Kobayashi, T., 0K	Nosavan, J., 04
Konishi, T., 0G	Obein, Gael, 1D
Krot, Yury, 26	Ochiai, Satoshi, 0M, 0N
Kubota, T., 0G	Ohno, Yuichi, 0H
Lachérade, Sophie, 05, 06, 0Y, 0Z	Ojanen, Harri J., 1M
Lastri, Cinzia, 1R	Okada, Kazuyuki, 0H
Lekouara, Mounir, 03	Okamura, Yoshihiko, 0I
Leone, B., 0O	Oki, R., 0G
Levillain, Y., 0O	Ono, Hidehiko, 1X, 1Z
L'Heureux, Michelle, 1D	Ortuño, R., 1I
Li, Chunlai, 1S	Ouaknine, Julien, 03
Li, Jun, 25	Ozeki, Hiroyuki, 0M, 0N
Li, Liansheng, 27	Padula, Francis, 17
Li, Xin, 1E	Pearlman, Aaron J., 17
Ling, Jer, 0S	Petrucchi, B., 04
Link, Daniel, 10, 11	Pieroux, Didier, 1M
Liu, Tung-chang, 21	Pigouche, Olivier, 03
Lobb, Daniel, 1C	Pippi, Ivan, 1R
Loizzo, R., 1Q	Piqueras, M. A., 1I
Lonjou, V., 05, 06	Pontetti, Giorgia, 1H
Lopinto, Ettore, 1R	Pool, Peter, 0U
Lv, Gang, 1S	Prat, Guylaine, 24
Ma, Xiaofei, 1F	Priestley, Kory, 15
Madhavan, Sriharsha, 13	Raimondi, Valentina, 1R
Maisonobe, Luc, 24	Ravel, Karen, 0W
Manago, Naohiro, 0M, 0N	Raynaud, J.-L., 04, 05, 06
Mannila, Rami, 1M	Riuné, Céline, 0R
Manolis, Ilias, 1N	Rong, Zhiguo, 1E
Marcq, Sébastien, 05, 06, 19	Ruythooren, Wouter, 0T
Maresi, Luca, 1H	Saari, Heikki, 1M

Sacco, P., 1P, 1Q
 Sakai, Michito, 0E
 Sakaizawa, D., 0K
 Sakuma, Fumihiko, 1X, 1Z
 Santurri, Leonardo, 1R
 Sato, Kenji, 0H
 Scharpf, Dan, 1D
 Seki, Yoshihiro, 0H
 Selva, Massimo, 1R
 Seyral, Jean, 24
 Shankar, Mohan, 15
 Shao, Xi, 18, 21
 Sheng, Weidong, 22, 25
 Shimada, Masanobu, 0D
 Shimoda, Haruhisa, 0B
 Shiotani, Masato, 0N
 Shiratama, Koichi, 0I
 Shu, Rong, 1S
 Shugarov, Andrey, 0U
 Smit, H., 0X
 Smith, Nathaniel, 15
 Smith, Nitchie, 15
 Spark, Stephen, 0U
 Stone, T., 0Z
 Suzuki, Makoto, 0M, 0N
 Suzuki, Shinichi, 0D
 Takahashi, Nobuhiro, 0H
 Tan, C. H., 0V
 Tanaka, Kazuhiro, 0I
 Tatsumi, Kenji, 1X, 1Z
 ter Haar, J., 0X
 Thomas, Susan, 15
 Thöt, Richard, 0P
 Tomita, Eiichi, 0H
 Tomiyama, Nobuhiro, 0H
 Trémas, T., 04, 05, 06
 Uzawa, Yoshinori, 0N
 van der Luit, K., 0X
 van der Zanden, Koen, 0T
 Van Duinkerken, G., 0X
 Vanhellemont, Filip, 1M
 Verez, Bernard, 03
 Vermeiren, Jan, 0T
 Vinella, Rosa Maria, 0T
 Vink, Ramon, 1N
 Voland, C., 0O
 Wagner, S. C., 0Z
 Wald, Andrew, 14
 Walikainen, Dale, 15
 Walker, Andrew, 0U
 Waltham, Nick, 0U
 Wang, Weng Lyang (Bill), 0S
 Wang, Binyong, 1S
 Wang, Difeng, 20
 Wang, H., 1I
 Wang, Jianyu, 1S
 Wang, Wenhui, 21
 Wang, Xiaokai, 1F
 Wang, Xueying, 25
 Wang, Zhipeng, 0Y, 10

Wei, Ji-An, 20
 Wenny, Brian, 13
 Wilson, Mark, 03
 Woolliams, Emma, 19
 Wouters, Kristof, 0T
 Wu, Aisheng, 13, 14
 Wu, Haohao, 28
 Wu, Jing, 22
 Wu, Lihua, 22
 Wu, Xiangqian, 17, 18
 Xiong, Xiaoxiong Jack, 0Y, 0Z, 10, 11, 13, 14
 Xu, Rui, 1S
 Yu, Fangfang, 18
 Yuan, Liyin, 1S
 Zahir, M., 0O
 Zhang, Bin, 21
 Zhang, Dandan, 28
 Zhang, Huijing, 28
 Zhang, Lijun, 1E
 Zhang, Xiaohong, 1W
 Zhang, Yong, 1E
 Zhou, Hao, 27
 Zhou, Mei, 28
 Zhou, X., 0V
 Zuccaro Marchi, Alessandro, 1H
 Zuo, Fuchang, 27

Conference Committee

Symposium Chair

Charles R. Bostater, Florida Institute of Technology, Marine-
Environmental Optics Laboratory and Remote Sensing Center
(United States)

Symposium Co-chair

Klaus Schäfer, Karlsruhe Institute of Technology, Institute of
Meterology and Climate Research (Germany)

Conference Chairs

Roland Meynart, European Space Research and Technology Center
(Netherlands)
Steven P. Neeck, NASA Headquarters (United States)
Haruhisa Shimoda, Tokai University (Japan)

Conference Co-chair

Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

Conference Programme Committee

Olivier Saint-Pe, Airbus Defence and Space (France)
Xiaoxiong J. Xiong, NASA Goddard Space Flight Center
(United States)

Session Chairs

- 1 European Missions
Roland Meynart, European Space Research and Technology Center
(Netherlands)
- 2 US Missions
Steven P. Neeck, NASA Headquarters (United States)
- 3 Japanese Missions I
Haruhisa Shimoda, Tokai University (Japan)
Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)
- 4 Japanese Missions II
Haruhisa Shimoda, Tokai University (Japan)
Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)

- 5 Japanese Missions III
Haruhisa Shimoda, Tokai University (Japan)
Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)
- 6 Focal Plane Assemblies I
Olivier Saint-Pe, Airbus Defence and Space (France)
- 7 Focal Plane Assemblies II
Olivier Saint-Pe, Airbus Defence and Space (France)
- 8 Calibration I
Xiaoxiong J. Xiong, NASA Goddard Space Flight Center
(United States)
- 9 Calibration II
Xiaoxiong J. Xiong, NASA Goddard Space Flight Center
(United States)
- 10 Calibration III
Xiaoxiong J. Xiong, NASA Goddard Space Flight Center
(United States)
- 11 Calibration IV
Xiaoxiong J. Xiong, NASA Goddard Space Flight Center
(United States)
- 12 Missions and Technologies I
Steven P. Neeck, NASA Headquarters (United States)
- 13 Missions and Technologies II
Haruhisa Shimoda, Tokai University (Japan)
- 14 Missions and Technologies III
Haruhisa Shimoda, Tokai University (Japan)
- 15 Missions and Technologies IV
Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)
- 16 Missions and Technologies V
Toshiyoshi Kimura, Japan Aerospace Exploration Agency (Japan)