

CubeSats and NanoSats for Remote Sensing II

Tuesday - Wednesday 21 - 22 August 2018

Conference Sessions At A Glance

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1: Keynote Session
 2: Atmosphere, Weather, and Climate
 3: Land and Ocean I
 4: Land and Ocean II
 5: Planetary and Human Exploration
 6: High-Power Lasers and FT-IR Spectrometers for CubeSat Deployment I
 Remote Sensing Plenary Session
 7: High-Power Lasers and FT-IR Spectrometers for CubeSat Deployment II
 8: Other Sensors
 9: Enabling Technologies
 Posters-Wednesday

Important Dates

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Abstract Due:
7 February 2018

Author Notification:
16 April 2018

Manuscript Due Date:
25 July 2018

Conference Committee

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Conference Chairs

[Thomas S. Pagano](#), Jet Propulsion Lab. (United States)
[Charles D. Norton](#), Jet Propulsion Lab. (United States)

Program Committee

[Sachidananda R. Babu](#), NASA Earth Science Technology Office (United States)
[William J. Blackwell](#), MIT Lincoln Lab. (United States)
 Pamela E. Clark, Jet Propulsion Lab. (United States)
[Siegfried W. Janson](#), The Aerospace Corp. (United States)
 Clarence M. Korendyke, U.S. Naval Research Lab. (United States)

Program Committee continued...

Benjamin K. Malphrus, Morehead State Univ. (United States)
 Pamela Millar, NASA Goddard Space Flight Ctr. (United States)
[Pantazis Mouroulis](#), Jet Propulsion Lab. (United States)
 Jordi Puig-Suari, California Polytechnic State Univ., San Luis Obispo (United States)
[Jeffery J. Puschell](#), Raytheon Space and Airborne Systems (United States)
 Aaron Ridley, Univ. of Michigan (United States)
[Charles M. Swenson](#), Utah State Univ. (United States)

TUESDAY 21 AUGUST

[Show All Abstracts](#)


Session 1: Keynote Session

Tuesday 21 August 2018
 8:00 AM - 8:30 AM
 Location: Conv. Ctr. Room 30D

Session Chair: [Charles D. Norton](#), Jet Propulsion Lab. (United States)

NASA's strategic goals for small satellite science (Keynote Presentation)

Paper 10769-1
 Time: 8:00 AM - 8:30 AM
 Author(s): Charles D. Norton, Jet Propulsion Lab. (United States)

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Session 2: Atmosphere, Weather, and Climate

Tuesday 21 August 2018
 8:30 AM - 11:20 AM
 Location: Conv. Ctr. Room 30D


Session Chair: [Thomas S. Pagano](#), Jet Propulsion Lab. (United States)

A novel CubeSat payload for airglow measurements in the mesosphere and lower thermosphere

Paper 10769-2

Time: 8:30 AM - 8:50 AM

Author(s): Friedhelm Olschewski, Bergische Univ. Wuppertal (Germany); Martin Kaufmann, Forschungszentrum Jülich GmbH (Germany); Klaus Mantel, Max-Planck-Institut für die Physik des Lichts (Germany); Martin Riese, Ralf Koppmann, Bergische Univ. Wuppertal (Germany)


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Architectures for Earth-observing CubeSat scatterometers

Paper 10769-3

Time: 8:50 AM - 9:10 AM

Author(s): M. Patrick Walton, David G. Long, Brigham Young Univ. (United States)


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A GNSS receiver for small-sats enabling precision pod, radio occultations, and reflections

Paper 10769-4

Time: 9:10 AM - 9:30 AM

Author(s): Garth Franklin, Stephan Esterhuizen, Chad Galley, Byron Iijima, Kameron Larsen, Myron Lee, Jehhal Liu, Thomas Meehan, Lawrence Young, Jet Propulsion Lab. (United States)


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Technology development in support of hyperspectral infrared atmospheric sounding in a CubeSat

Paper 10769-5

Time: 9:30 AM - 9:50 AM

Author(s): Thomas S. Pagano, Carlo Abesamis, Andres Andrade, Hartmut H. Aumann, Sarath Gunapala, Cate Heneghan, Robert F. Jarrot, Dean L. Johnson, Andrew U. Lamborn, Yuki Maruyama, Sir B. Rafol, Nasrat A. Raouf, David M. Rider, Dave Ting, Daniel W. Wilson, Karl Y. Yee, Jet Propulsion Lab. (United States); Jerold Cole, William Good, Thomas U. Kampe, Juan Carlos Soto, Ball Aerospace (United States); Am Adams, Matt Buckley, Richard Graham, Fred Nicol, Tony Vengel, John Moore, Thomas Coleman, IRCameras (United States); Steve Schneider, Chris Esser, Scott Inlow, Devon Sanders, Karl Hansen, Matt Zeigler, Charles Dumont, Rebecca Walter, Joe Piacentine, Blue Canyon Technologies (United States)


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CubeSat active thermal management in support of cooled electro-optical instrumentation for advanced atmospheric observing missions

Paper 10769-6

Time: 9:50 AM - 10:10 AM

Author(s): Lucas Anderson, Charles Swenson, Ryan Davidson, Utah State Univ. (United States); Arthur J. Mastropietro, Jet Propulsion Lab. (United States), California Institute of Technology (United States); Elham Maghsoudi, Jet Propulsion Lab. (United States); Simon Luong, Jet Propulsion Lab. (United States), California Institute of Technology (United States); Stefano Cappucci, Jet Propulsion Lab. (United States); Ian McKinley, Jet Propulsion Lab. (United States), California Institute of Technology (United States)

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Coffee Break 10:10 AM - 10:40 AM

Overview of the NASA TROPICS CubeSat Constellation Mission

Paper 10769-7

Time: 10:40 AM - 11:00 AM

Author(s): William J. Blackwell, MIT Lincoln Lab. (United States); Scott Braun, NASA Goddard Space Flight Ctr. (United States); Bradley T. Zavadsky, NASA Marshall Space Flight Ctr. (United States); Christopher Velden, Tom Greenwald, Derrick Herndon, Univ. of Wisconsin-Madison (United States); Ralf Bennartz, Vanderbilt Univ. (United States); Mark DeMaria, National Oceanic and Atmospheric Administration (United States); Galina Chirokova, Colorado State Univ. (United States); Robert M. Atlas, Jason Dunion, Frank Marks, Robert Rogers, Hui Christophersen, Bachir Annane, National Oceanic and Atmospheric Administration (United States)

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Observing system simulation experiments to assess the potential impact of CubeSats and other small satellite constellations on numerical weather prediction (Conference Presentation)

(Canceled)

Paper 10769-8

Time: 11:00 AM - 11:20 AM


Author(s):

Low-cost, low-risk spacecraft remote inspection using passive inspection CubeSats

Paper 10769-43

Time: 11:00 AM - 11:20 AM

Author(s): M. Patrick Walton, Brigham Young Univ. (United States)

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Session 3: Land and Ocean I

Tuesday 21 August 2018

11:20 AM - 12:00 PM

Location: Conv. Ctr. Room 30D

Session Chair: [Pantazis Mouroulis](#), Jet Propulsion Lab. (United States)


Snow and Water Imaging Spectrometer (SWIS): CubeSat configuration and design

Paper 10769-9

Time: 11:20 AM - 11:40 AM

Author(s): Holly A. Bender, Pantazis Mouroulis, Jet Propulsion Lab. (United States); John M. Bellardo, Cole T. Gillespie, Grigory J. Heaton, Michael A.

Fernandez, Nicholas N. Sizemore, California Polytechnic State University (United States); Andres Andrade, Elliott H. Liggett, Peter Sullivan, Didier Keymeulen, Jet Propulsion Lab. (United States); Christopher D. Smith, Sierra Lobo, Inc. (United States); Megan Gibson, Sierra Lobo (United States)


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Hawkeye ocean color instrument: performance summary

Paper 10769-10

Time: 11:40 AM - 12:00 PM

Author(s): Alan Holmes, Cloudland Instruments, Inc. (United States); John Morrison, The Univ. of North Carolina, Wilmington (United States); Gene Feldman, NASA Goddard Space Flight Ctr. (United States); Frederick Patt, Shihyan Lee, SAIC (United States)

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Lunch/Exhibition Break 12:00 PM - 1:30 PM

Session 4: Land and Ocean II

Tuesday 21 August 2018

1:30 PM - 2:30 PM

Location: Conv. Ctr. Room 30D


Session Chair: [Pantazis Mouroulis](#), Jet Propulsion Lab. (United States)

Constellations of CubeSats to exploit signals-of-opportunity for Earth system science

Paper 10769-35

Time: 1:30 PM - 1:50 PM

Author(s): Rashmi Shah, Anthony Freeman, Jet Propulsion Lab. (United States); James L. Garrison, Purdue University (United States)

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Estimation of forest health in Brazil using NanoSats

(Canceled)

Paper 10769-12

Time: 1:50 PM - 2:10 PM

Author(s):

The Arkyd-6 mid-wave infrared instrument: ground testing, commissioning, and operations (Conference Presentation)

Paper 10769-13

Time: 2:10 PM - 2:30 PM

Author(s): Kevin Lalli, Planetary Resources, Inc. (United States)

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Session 5: Planetary and Human Exploration

Tuesday 21 August 2018

2:30 PM - 5:00 PM

Location: Conv. Ctr. Room 30D


Session Chair: Pamela E. Clark, Jet Propulsion Lab. (United States)

Nature of and lessons learned from Lunar Ice Cube and the first deep space CubeSat 'Cluster'

Paper 10769-14

Time: 2:30 PM - 2:50 PM

Author(s): Pamela E. Clark, Jet Propulsion Lab. (United States); Robert MacDowall, William Farrell, Cliff Brambora, Allen W. Lunsford, Terry Hurford, Dave Folta, NASA Goddard Space Flight Ctr. (United States); Benjamin Malphrus, Morehead State Univ. (United States); Matthew D. Grubb, NASA IV&V (United States)


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The Lunar Flashlight CubeSat instrument: A compact SWIR laser reflectometer to quantify and map water ice on the surface of the Moon

Paper 10769-15

Time: 2:50 PM - 3:10 PM

Author(s): Udo J. Wehmeier, Jet Propulsion Lab. (United States); Quentin Vinckier, Robert G. Sellar, Christopher G. Paine, Jet Propulsion Lab. (United States); Paul O. Hayne, Univ. of Colorado Boulder (United States); Mahmood Bagheri, Mina Rais-Zadeh, Siamak Forouhar, Jessica Loveland, Jacob H. Shelton, Jet Propulsion Lab. (United States)


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Overview of Phobos/Deimos Regolith Ion Sample Mission (PRISM) concept

Paper 10769-16

Time: 3:10 PM - 3:30 PM

Author(s): Pamela E. Clark, Jet Propulsion Lab. (United States); Michael Collier, NASA Goddard Space Flight Ctr. (United States); Micah Schaible, Georgia Institute of Technology (United States); William Farrell, Dave Folta, Kyle Hughes, John Keller, NASA Goddard Space Flight Ctr. (United States); Benjamin Malphrus, Morehead State Univ. (United States); Andrew Rivkin, Scott Murchie, Dana Hurley, Johns Hopkins Univ. Applied Physics Lab., LLC (United States); Jasper Halekas, The Univ. of Iowa (United States); Richard Vondrak, Timothy Stubbs, Rosemary Killen, Menelaos Sarantos, Sarah Jones, Jared Espley, NASA Goddard Space Flight Ctr. (United States); Gina Dibraccio, NASA/GSFC (United States)

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Coffee Break 3:30 PM - 4:00 PM

Primitive object volatile explorer (PrOVE): opportunistic deep space missions to comets

Paper 10769-17

Time: 4:00 PM - 4:20 PM


Author(s): Pamela E. Clark, Jet Propulsion Lab. (United States); Tilak Hewagama, Univ. of Maryland, College Park (United States), NASA Goddard Space Flight Ctr. (United States); Shahid Aslam, NASA Goddard Space Flight Ctr. (United States); James M. Bauer, Univ. of Maryland, College Park (United States); Michael Daly, York Univ. (United States); Lori Feaga, Univ. of Maryland (United States); Dave Folta, Nicolas Gorius, Kyle Hughes, Terry Hurford, Donald Jennings, Timothy Livengood, Michael Mumma, Conor Nixon, NASA Goddard Space Flight Ctr. (United States); Jessica Sunshine, Univ. of Maryland, College Park (United States); Geronimo Villanueva, NASA Goddard Space Flight Ctr. (United States); Kevin Brown, Benjamin Malphrus, Aaron Zucherman, Morehead State Univ. (United States)

[Add To My Schedule](#) **A constellation of Microsats to search for NEOs**

Paper 10769-20

Time: 4:20 PM - 4:40 PM


Author(s): Michael Shao, Hanying zhou, slava turyshev, chengxing zhai, Navtej Saini, Russell Trahan, Jet Propulsion Lab. (United States)

[Add To My Schedule](#) **Inter-satellite omnidirectional optical communicator for remote sensing**

Paper 10769-21

Time: 4:40 PM - 5:00 PM

Author(s): Jose E. Velazco, Joseph Griffin, Danny Wernicke, John Huleis, Andrew DeNucci, Jet Propulsion Lab. (United States); Ozdal Boyraz, Imam Uz Zaman, Univ. of California, Irvine (United States)

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WEDNESDAY 22 AUGUST[Show All Abstracts](#)

**Session 6:
High-Power Lasers and FT-IR Spectrometers for CubeSat Deployment I**

Wednesday 22 August 2018

8:00 AM - 10:30 AM

Location: Conv. Ctr. Room 30D


Session Chair: [Siegfried W. Janson](#), The Aerospace Corp. (United States)

A CubeSat mission for space-environment demonstration of remote laser-evaporative molecular absorption (R-LEMA) spectroscopy sensor system concept (Invited Paper)

Paper 10769-22

Time: 8:00 AM - 8:30 AM


Author(s): Pedro S. Moura, Bruno G. Serpa, Bruno C. Assis, Yan Moura, Vinicius P. Alves, Katryn A. Schenguer, Breno L. Tumelero, Ana Luz, Luiz J. C. Novaes, Amanda Cabral, Daniel V. Rotter, Nicolas Rossini, Pedro M. R. Santos, Thomas K. Bretzke, Melissa de Souza, Karina Morais, Daniel Champoski, Dayane T. Vieira, Gabriel Spricigo, Eduardo De Carli, Silva L. S. Tagliatenha, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

[Add To My Schedule](#) **Remote laser evaporative molecular absorption (R-LEMA) spectroscopy laboratory experiments (Conference Presentation)**

Paper 10769-23

Time: 8:30 AM - 8:50 AM


Author(s): Jonathan A. Madajian, Univ. of California, Santa Barbara (United States); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States); Benton Miller, Yu Wang, Daniel C. Brouwer, Alexander Cohen, Jessie Su, Prashant Srinivasan, Univ. of California, Santa Barbara (United States); Travis R. Brashears, Univ. of California, Berkeley (United States); Nicholas Rupert, Philip M. Lubin, Univ. of California, Santa Barbara (United States); William Strickland, Univ. of California (United States)

[Add To My Schedule](#) **Experimental design for remote laser evaporative molecular absorption spectroscopy sensor system concept**

Paper 10769-24

Time: 8:50 AM - 9:10 AM


Author(s): Amber Sucich, Tomas Snyder, Ricardo Bittencourt, California Polytechnic State Univ., San Luis Obispo (United States); Edinan Cirilo, University of Parana (Brazil); Jonathan Madajian, Yu Wang, Univ. of California, Santa Barbara (United States); Benton Miller, Univ. of California (United States); Prashant Srinivasan, Philip M. Lubin, Univ. of California, Santa Barbara (United States); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

[Add To My Schedule](#) **Control system development for a R-LEMA testing CubeSat experiment**

Paper 10769-25

Time: 9:10 AM - 9:30 AM

Author(s): Lucas Casaril, Bruno Lugnani de Souza, Luiz Felipe Pscheidt, Mairon de Souza Wolniewicz, Alexandro Garro Brito, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)


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High-power laser subsystem for a 6U CubeSat mission

Paper 10769-26

Time: 9:30 AM - 9:50 AM


Author(s): Gabriel Jantsch, Gabriela Lopes, Paola Pienta, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

[Add To My Schedule](#) **Spectrometer subsystem for a CubeSat mission to test remote laser- evaporative molecular absorption (R-LEMA) spectroscopy concept in the space environment**

Paper 10769-27

Time: 9:50 AM - 10:10 AM


Author(s): Lillian Rodrigues, Yuri Winche, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

[Add To My Schedule](#) **Energy subsystem analysis for a 6U CubeSat mission utilizing high-power laser and FT-IR spectrometer**

Paper 10769-28

Time: 10:10 AM - 10:30 AM

Author(s): Ricardo Bittencourt, Davi S. Albuquerque, Augusto R. Ferreira, Willians G. Cavalcante, Gabriel F. Marconcini, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

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Coffee Break 10:30 AM - 11:00 AM

**Session Plen:
Remote Sensing Plenary Session**

Wednesday 22 August 2018

11:00 AM - 11:50 AM


Location: Conv. Ctr. Ballroom 20A

Session Chair: [James J. Butler](#), NASA Goddard Space Flight Ctr. (United States)**Remote sensing of weather, climate, and environment (Conference Presentation) (Plenary Presentation)**

Paper 10764-401

Time: 11:00 AM - 11:50 AM

Author(s): K. Dieter Klaes, EUMETSAT (Germany)

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Lunch/Exhibition Break 11:50 AM - 1:20 PM

**Session 7:
High-Power Lasers and FT-IR Spectrometers for CubeSat Deployment II**

Wednesday 22 August 2018

1:20 PM - 2:20 PM


Location: Conv. Ctr. Room 30D

Session Chair: [Siegfried W. Janson](#), The Aerospace Corp. (United States)**Thermal control analysis on a 6U CubeSat equipped with a high-power laser**

Paper 10769-29

Time: 1:20 PM - 1:40 PM


Author(s): Bárbara M. Franco, Guilherme L. Dornelles, Luis F. O. Riva, Jhônatas H. Garcia, Djulia L. Guarnieri, Kleber V. Paiva, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

[Add To My Schedule](#) **Preliminary studies of the impact on temperature of a high-power laser on-board a 6U CubeSat**

Paper 10769-30

Time: 1:40 PM - 2:00 PM


Author(s): Edemar Morsch Filho, Rodrigo S. Santiago, Mateus M. B. Costa, Kleber V. Paiva, Talita S. Possamai, Renato Oba, Univ. Federal de Santa Catarina (Brazil); Vicente de Paulo Nicolau, Federal University of Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

[Add To My Schedule](#) **Analysis of a dual CubeSat communication system for a formation-flying experiment**

Paper 10769-31

Time: 2:00 PM - 2:20 PM

Author(s): Antonio C. R. do Nascimento, Gabriel Teodoro, Jefferson Mika, Mateus M. B. Costa, Univ. Federal de Santa Catarina (Brazil); Gary B. Hughes, California Polytechnic State Univ., San Luis Obispo (United States)

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Session 8: Other Sensors

Wednesday 22 August 2018
2:20 PM - 3:20 PM
Location: Conv. Ctr. Room 30D

Session Chair: Benjamin K. Malphrus, Morehead State Univ. (United States)

Evaluation of UV optics for Triple Tiny Ionospheric Photometers on CubeSat missions

Paper 10769-32

Time: 2:20 PM - 2:40 PM

Author(s): Andrew W. Stephan, Peter Marquis, Scott A. Budzien, Kenneth F. Dymond, Charles M. Brown, U.S. Naval Research Lab. (United States); Kenneth D. Wolfram, Praxis, Inc. (United States); Andrew C. Nicholas, U.S. Naval Research Lab. (United States)


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A small satellite mission for solar coronagraphy

Paper 10769-33

Time: 2:40 PM - 3:00 PM

Author(s): Natchimuthuk Gopalswamy, Qian Gong, NASA Goddard Space Flight Ctr. (United States)


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LetSat-1: a GPU technology demonstrator and AI navigation system

Paper 10769-34

Time: 3:00 PM - 3:20 PM

Author(s): Clifford White, Chandler Griscom, Prabodh Jhaveri, Elizabeth Keener, Byron Lichtenberg, LeTourneau Univ. (United States)

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Coffee Break 3:20 PM - 3:50 PM

Session 9: Enabling Technologies

Wednesday 22 August 2018
3:50 PM - 5:10 PM
Location: Conv. Ctr. Room 30D


Session Chairs: [Sachidananda R. Babu](#), NASA Earth Science Technology Office (United States) ; Robert Bauer, NASA Goddard Space Flight Ctr. (United States)

High performance CubeSat remote sensing platforms (Conference Presentation)

Paper 10769-36

Time: 3:50 PM - 4:10 PM

Author(s): Daniel Hegel, Blue Canyon Technologies Inc. (United States)


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Deep space laser communication hardware driver (Conference Presentation)

Paper 10769-37

Time: 4:10 PM - 4:30 PM

Author(s): Jonathan A. Madajian, Nicholas Rupert, Victoria Rosborough, Univ. of California, Santa Barbara (United States); Steven B. Estrella, Freedom Photonics, LLC (United States); Henry Lee, Raytheon Co. (United States); Sergio Pinna, Joseph Fridlander, Philip M. Lubin, Jonathan Klamkin, Univ. of California, Santa Barbara (United States)


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Exploratory simulations of directed energy beam interception with Earth-orbiting satellites

Paper 10769-38

Time: 4:30 PM - 4:50 PM

Author(s): Harrison She, The Univ. of Auckland (New Zealand); Will Hettel, Philip M. Lubin, Univ. of California, Santa Barbara (United States); Kyle Friedman, Granada Hills Charter High School (United States); Leo Glikbarg, Dos Pueblos High School (United States)

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ODALISS: An optical communications transceiver for CubeSats (Canceled)

Paper 10769-39

Time: 4:50 PM - 5:10 PM

Author(s):

Session PWed: Posters-Wednesday

Wednesday 22 August 2018
5:30 PM - 7:30 PM

Location: Conv. Ctr. Room 20C

Conference attendees are invited to 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 authors, view poster presentation guidelines at <http://spie.org/OPPosterGuidelines>.

**APIS: The miniaturized earth observation camera on-board OPTOS CubeSat
(Canceled)**

Paper 10769-40

Time: 5:30 PM - 7:30 PM


Author(s):

Advanced multi-mission operations system instrument toolkit: an open source instrument and small satellite operations toolkit

Paper 10769-41

Time: 5:30 PM - 7:30 PM

Author(s): Michael Joyce, Luke Dahl, Lorraine Sposto, Jet Propulsion Lab. (United States)

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Omnidirectional optical transceiver design techniques for multi-frequency full duplex CubeSat data communication

Paper 10769-42

Time: 5:30 PM - 7:30 PM

Author(s): Imam Uz Zaman, Univ. of California, Irvine (United States); Andrew W. Janzen, Jet Propulsion Lab. (United States); Rasul Torun, Univ. of California, Irvine (United States); Michael Peng, Jose E. Velazco, Jet Propulsion Lab. (United States); Ozdal Boyraz, Univ. of California, Irvine (United States)

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