

2026 IEEE Aerospace Conference

Big Sky, Montana, USA

7-14 March 2026

Pages 1–763

IEEE Catalog Number:
ISBN:

CFP26AAC-POD
979-8-3315-7361-4



Copyright © 2026, IEEE

All Rights Reserved

Copyright and Reprint Permissions:

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP26AAC-POD
ISBN (Print-On-Demand):	979-8-3315-7361-4
ISBN (Online):	979-8-3315-7360-7
ISSN:	1095-323X

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA

Phone:	(845) 758-0400
Fax:	(845) 758-2633
E-mail:	curran@proceedings.com
Web:	www.proceedings.com

TABLE OF CONTENTS

Overcoming Challenges of Realism in Competitive Space-Based Reinforcement Learning with AstroCraft	1
<i>Loren James Anderson, R. Scott Erwin, Moses Hansen, Victoria Outkin, Rehman S. Qureshi Anthony Aborizk, Rohan Kulkarni, Elyssa Dennery, Sahitya Senapathy, Srija Makkapati, William Flathmann Kathryn Alcalde, Berkan Dokmeci, Shahin Firouzbakht, Edfil Basan</i>	
Using an MBSE Approach to Develop Jamming Capabilities for a Counter-Drone System	14
<i>Calliott Scheuermann, Vikram Mittal</i>	
Updated Model of Geometric Effects in Digital Micromirror Devices for Spacecraft Attitude Control	24
<i>Jonathan Messer</i>	
AeroAssist: A Prompt-Driven Multimodal AI Framework for Aircraft Maintenance	32
<i>Sandeep Kalari, Abhinav Panchumarthi, Vikas Ashok, Ravi Mukkamala</i>	
The Impact of Major Anomalies of Robotic Mars Surface Missions on Mission Timeline	44
<i>Matt Heverly, Magdy Bareh</i>	
Performance Analysis of Signals Integration Approaches in Digital Communication Systems	58
<i>Ashraf M. Aziz, Shawki A. Saad, Ahmed S. Shalaby, Mohamed Mostafa</i>	
“Space Law. What Will we do with Space Debris? An Analysis Based on Selected Legal Examples”	67
<i>Mikołaj Mazan</i>	
Pathway to Mission Success: Lessons Learned from the SPHEREX AI&T and V&V Program	74
<i>William Hart, Farah Alibay, Heather Bottom, Leina Hutchinson, Matt James, Jennifer Rocca, Sara Susca Tracy Van Houten, Shannon Mihaly</i>	
Autonomous Tip-and-Cue Earth-Observing Constellation Tasking with Reinforcement Learning	88
<i>Mark Stephenson, Hanspeter Schaub</i>	
Unsupervised RF Modulation Classification via Domaininformed Design-Space Exploration and Semantic Subspaces	98
<i>Joseph Krozak</i>	
A Cyber-Physical Testing Framework for Evaluating Space Habitat Performance	118
<i>Herta Montoya, Manuel Salmeron, Motahareh Mirfarah, Sreehari Manikkan, Christian E. Silva Shirley J. Dyke</i>	
Protecting Against Space Invaders: An AI-Driven Framework for Proactively Defending Space Systems	130
<i>Kendra Cook</i>	
A Generative Modeling Approach to Resource-Efficient Early Mission Concept Formulation	148
<i>Alfred Nash</i>	
An NTN Uplink Radio Interface Based on Constant-Envelope Multicarrier Modulations and NOMA	156
<i>Claudio Sacchi, Gian Marco Mendolia, Giulia Buttazoni</i>	
High-Power Radio Frequency Anti-Satellite (ASAT) Weapons - Technical Aspects of an Emerging Threat	174
<i>Grzegorz Lubkowski, Michael Suhrke, Marian Lanzrath, Martin Schwarz</i>	

Epidemics in Orbit: Modeling Space Debris Dynamics to Alleviate the Orbital Traffic Jam	182
<i>Rachel Sholder</i>	
A Methodology to Predict Supersonic Shock-Induced Performance Metrics in Scramjets Through Machine Learning Algorithms and Reduced-Order Models Powered by Comprehensive CFD Analysis	197
<i>Rehaan Kadhar</i>	
A High-Fidelity Actuator Model for Robotic Autonomy in Space and Beyond	210
<i>Preston Rogers, Joseph Bowkett, Paul Backes</i>	
Hot Cathode Ionization in Space: Characterization and Improved Beam Shaping for the NIM MS on JUICE	220
<i>Samuel Stefan Wyler, Rico G. Fausch, Robin F. Bonny, Lorenzo Obersnel, André Galli, Audrey Vorburger Peter Wurz</i>	
Automated Consistency Checks of Contract Data Requirement Lists and Model-Based Systems Engineering Models Using Natural Language Processing	234
<i>Matthew Giorgio, Jeremy Marshall, John Roberts, Aleksandra Khusid, Jyotirmay Gadewadikar</i>	
Coordinated World Model Learning for Deep Space Robot Teams	240
<i>Andrzej M.J. Skulimowski</i>	
Spectrum Scoring and Adaptive Swarm Optimization for the Ion Optics of the NIM TOF MS on JUICE	256
<i>Samuel Stefan Wyler, Peter Keresztes Schmidt, André Galli, Robin F. Bonny, Rico G. Fausch Audrey H. Vorburger, Peter Wurz</i>	
Learning Safety-Guaranteed, Non-Greedy Control Barrier Functions Using Reinforcement Learning	273
<i>Minduli Wijayatunga, Nathan Wallace, Salah Sukkarieh, Roberto Armellin</i>	
Gesture-Based Human-in-the-Loop Control of Space Exploration Vehicle Convoys	287
<i>James Tukupah, Damla Leblebicioglu, Ben Cometto, Katiso Mabulu, Michael Shaham, Taskin Padir</i>	
Evaluation of Crew Emergency Return Capability During Lunar Terrain Excursions Using a Motion Table-Based Vehicle Simulator	301
<i>Harry L. Litaker, Omar S. Bekdash, Blake S. Chakalis, Lourdes S. Ibrahim, Cory D. Foreman Lee K. Bingham, Adrienne M. Ondrusek</i>	
Evaluating Metamodel Quality of the Cubesat System Reference Model (CSRM) to Improve Domain-Specific Languages (DSL)	315
<i>Sarah Rudder, David Kaslow, Jim Adams</i>	
Inflight Performance of Pose and Position Vision Based Sensor Enabling Submillimetre Formation Flight	325
<i>Mathias Benn, John L. Jørgensen, Peter S. Jørgensen, Troelz Denver, Raphael Rougeot, Daniel Serrano</i>	
Spectral Mapping of Mars at the Context Scale	333
<i>Peter Sullivan, Christine Bradley, Joseph Ewing, Olya Filiminova, Abigail Fraeman, Bryant Mueller David R. Thompson, David Z. Ting, Robert O. Green</i>	
Proximeter: an Automated Rover Arm Placement Safety Evaluation Tool	347
<i>Harel Dor, Emily Newman, Justin Huang</i>	
Examination of the Joint Augmented Reality (AR) Navigation System for Lunar Surface Operations	355
<i>Amanda Smith, Sarosh Nandwani, Andrew Nakushian, Paromita Mitra, Briana Krygier, Matthew Miller</i>	

Architecting a Robust Software Stack for Small Satellites using ROS2, Docker, Zenoh, and ZFS	367
<i>Raajitha Rajkumar, Shon Cortes, Phaedrus Leeds, Gabriel St. Angel</i>	
Development of a Novel Decompression Profile and Physiological Response to Polaris Dawn's EVA	378
<i>Marissa Rosenberg, Amran Asadi, Esther Putman, Brandon Trapp, Chris Trigg, Jaime Mateus</i>	
Behavior Analysis of Charged Lunar Regolith Simulants Lifted by Metal Wheel in Vacuum Environment	394
<i>Tadashi Matsuura, Hiroaki Kawamura, Shinichiro Noda, Nobutaka Tanishima, Natsu Fujioka</i>	
Agile Tradespace Exploration for Space Rendezvous Mission Design via Transformers	405
<i>Yuji Takubo, Daniele Gammelli, Marco Pavone, Simone D'Amico</i>	
TATERS (Tool for Autonomous Terrain Exploration of Remote Spaces)	419
<i>Richard Chase, Tyler Doiron, Ryan Navarre, Meryl Spencer, Zane Almquist, Nathan Lemus</i>	
HERMES: A Satellite Surrogate and Ground Station Communication Testbed for CubeSats Using SDR and OpenC3 COSMOS	433
<i>Luiz Felipe Bromfman, Gustavo Gargioni, Zachary Leffke</i>	
Collaborative LLM-Based Agents for Autonomous Multi-UAV Mission Execution	441
<i>Jeremy Ludwig, Daniel Tuohy, Forest Finnigan</i>	
Replacing Subspace Tracking Methods With Dynamic Mode Decomposition	449
<i>Efrain H. Gonzalez, Carole R. Hall, Cove J. Kramer, Curtis K. Madsen, Craig M. Vineyard, Jason Adams</i>	
Continuing Development and Enabling of Exploration Mission Systems Software	465
<i>Matthew Miller, David Charney, Kenneth Davis, Jacob Keller, Jackie Vu, Ben Feist, David MacKenzie</i> <i>Luke McSherry, Arwa Khazali, Omar Baig, John Cox, Cameron Pittman, James Montalvo</i>	
Review of Advanced Informatics and Display Systems for Extravehicular Activity Operations	475
<i>Joshua T. Elston, Jacob R. Keller, Matthew J. Miller, Susannah B. Paletz, Lauren B. Landon</i> <i>Paromita Mitra, John A. Karasinski, Jessica J. Marquez</i>	
Path Planning in Dynamic Spatio-Temporal Space for the Lunar Surface	493
<i>M. Spencer, R. Navarre, Z. Almquist, T. Doiron, H. Matul, R. Chase</i>	
Rotor Dynamics and Sprayer Efficiency in Agricultural UAVs	501
<i>Harrison Dean, Srikanth Bashetty</i>	
MBSE in Space Mission Concept Development	511
<i>Blake DeVaney, Maxwell Harrow, Debarati Chattopadhyay, Matthew Morris, Dannie Smith, Jason Arcido</i>	
Terrain-Aware Low-Altitude Path Planning	522
<i>Yixuan Jia, Andrea Tagliabue, Annika Thomas, Navid Dadkhah Tehrani, Jonathan P. How</i>	
Guidance and Control Assessments of Psyche Mission's Monthly Operations Sequences	530
<i>David Sternberg, Abby Couto, Michael Ying</i>	
Development of Radioisotope Stirling Generators for High Efficiency Space Power Generation	543
<i>Ernestina Wozniak, Matthew Stang, Salvatore Oriti, Ronald Leibach, Rebecca Buehrle, Hannah Sargeant</i> <i>Ramy Mesalam, Kris Bell, Robert Tute, Michael Barron, Natasha Miller</i>	
Hybrid Hard/Soft Data Association in Multi-Target Tracking	555
<i>Stefano Coraluppi, Matt Henry</i>	

Composite Habitat: An Incremental Development Path from Propellant Tank to Crewed Habitat	569
<i>Matthew Ziglar, Michael Elsperman</i>	
Design and Development of the Multi-Angle Imager for Aerosols (MAIA) Earth Venture Instrument	578
<i>K. Charles Wang, David J. Diner, Stacey W. Boland, Saagar S. Patel, Kevin A. Burke, Amanda C. Steffy</i>	
Development of Autonomous PHM for Bearing Fault Diagnosis	592
<i>David He, Miao He</i>	
Solving Geodesic Equations With Composite Bernstein Polynomials for Trajectory Planning	605
<i>Nick Gorman, Gage MacLin, Maxwell Hammond, Venanzio Cichella</i>	
A Physics-Informed Machine Learning Approach to the Jet Engine Aircraft Fuel Consumption Problem	616
<i>Francisco Velásquez-SanMartín, Marta Zárraga-Rodríguez, Xabier Insausti, Rubén Armañanzas</i> <i>Jesús Gutiérrez-Gutiérrez</i>	
Development of Procedures for a Regolith Experiment with Human-Robot Interaction at the Lunar South Pole for the LUNA Analog Facility	635
<i>Rosalinde Borrek, Carsten Hartmann, Aileen Rabsahl</i>	
From Analog Tests to the Moon: Situational Awareness Systems for Astronauts and Tourists	648
<i>Aileen Rabsahl, Bastian Ernst, Carsten Hartmann</i>	
A Thematic Approach to Robotic Path Planning on the Moon	655
<i>Ryan Navarre, Zane Almquist, Richard Chase</i>	
Scalable Ground Station Selection for Large LEO Constellations	666
<i>Grace Ra Kim, Duncan Eddy, Vedant Srinivas, Mykel J. Kochenderfer</i>	
Determinism in Avionics: Lack of Definition, Survey of its Use, and Taxonomy to Clarify its Meaning	680
<i>Bjorn Andersson, Dionisio de Niz, William Vance, John Ross, Roshini Ashok, Tuan Bui, Chase Blakey</i>	
Schedule Acceleration, Benefits, and Risks: Optimization Using a Forensic Approach	699
<i>Patrick K. Malone</i>	
Distobee: Design and System Review of a Mobile Platform for Lunar Regolith Excavation	715
<i>Mateusz Wójcik, Adam Michalik</i>	
Cryogenic Testbed for Passive Optical Data Links on Planetary Surface	726
<i>Caleb Lewis, Uriel Escobar, Andy Klaib, Lin Yi</i>	
A Data-Driven Surrogate Modeling and Sensor/Actuator Placement Framework for Flexible Spacecraft	732
<i>Matthew Hilsenrath, Daniel R. Herber</i>	
Decentralized Allocation of Observation Tasks for Cooperating Agile Spacecraft Clusters	741
<i>Nicholas Niziolek, Nolan Ales, Eric Frew, Jonathan Chan, Michael Jacobs, Sam Packard, Moses Chan</i>	
Reliability and Condition-Based Fusion Approaches to Prognostics	752
<i>Shashvat Prakash, Indramani Mohanty, Yang Zang</i>	
Boosting Digital Engineering Workforce Execution With a Semantic Data Fabric	764
<i>Kim Nunn, Heidi Davidz, Patrick Keen</i>	
Grasp Optimization for Space Manipulation Using Multiple Underactuated Spacecraft	774
<i>Jun Yang Li, M. Reza Emami</i>	

A Novel Grid-Based Conflict Detection Algorithm for Trajectory Based Operations	784
<i>Alexandra Newcomb, Sarah Reynolds, Luke Newcomb, Omar Ochoa</i>	
A Hybrid Centralized and Decentralized Framework for Traffic Management in Advanced Air Mobility	795
<i>Alexandra Newcomb, Omar Ochoa</i>	
Applying Patch-Based Backdoor Attacks to In-Orbit Federated Learning for Satellite Constellations	805
<i>Ghazal Rahmanian, Pooria Madani, Carolyn McGregor AM</i>	
Enhancing Orbital Debris Remediation with Reconfigurable Space-Based Laser Constellations	815
<i>David O. Williams Rogers, Hang Woon Lee</i>	
Impact of Technology and Methodology on Performance Metrics in Complex Aerospace Project Management	832
<i>Florent Nogueira, Érika Souza de Melo, Tian Zeng</i>	
An Open-Source Analytical Method for Determining Optimal Satellite Orbits for Region Targeting	853
<i>Ella Shepherd, Jordy Samaniego, Angel Reyna, Jacob Showman, Lukas Sandau, Matthew Chang Michael Pham</i>	
Is Simplicity Golden? a Survey of Post-Launch Adaptation in Planetary Missions	872
<i>Masahiro Ono, Richard Rieber, Tony Freeman, Mathieu Choukroun, Michel D. Ingham, Chloe Gentgen David Murrow, Daniel Selva</i>	
Calibrating IMU Pitch Misalignment in the Field to Reduce Wheel-Inertial Odometry Elevation Drift	887
<i>Tushaar Jain, David Wettergreen, Michael Kaess</i>	
A Bayesian Framework for Human-Agent Collaborative Fault Diagnosis in Space Habitats	904
<i>Joshua T. Elston, Kazuki Toma, David Kortenkamp, Daniel Selva</i>	
Cataloging Patterns in MBSE: A Starter Set	922
<i>Mark W. Maier</i>	
Planetary Volatiles Extractor (PVEx) for Sample Delivery on the Moon	935
<i>Frank Sheeran, Isabel King, Ben Collins, Sara Mayne, Kris Zacny, Jason Kriesel, Andrew Fahrland Jennifer Stern</i>	
E-TFT: Enhanced Temporal Fusion Transformer for Robust Early Detection of UAV Threats	945
<i>Shadi Sadeghpour</i>	
Indoor Testbed for Multirobot Research with Microdrones	955
<i>Kira Hofelmann, Connor Bishop, Daniel Louie, Christopher Waight, Rayyan Hussain, Jenny Huynh Caleb Sparks, Michael A. Neumann, Chris A. Kitts, Manoj Sharma</i>	
Silent Subversion: Sensor Spoofing Attacks via Supply Chain Implants in Satellite Systems	968
<i>Jack Vanlyssel, Gruia-Catalin Roman, Afsah Anwar</i>	
Convex Stability can Stabilize Dynamic Systems, Declared as Unstabilizable by Current Methods	978
<i>Rama Yedavalli</i>	
Evaluation of a Continuous Drive Autonomous Navigation Algorithm for Next-Generation Lunar Rovers	993
<i>Young-Young Shen, Alexander Demishkevich</i>	

Space Interferometry Formation Design Using Relative Orbital Elements: The STARI Mission	1004
<i>Antonio Rizza, Ethan Foss, John Monnier, James W. Cutler, Simone D'Amico</i>	
Foundational Analysis of Safety Engineering Requirements (SAFER)	1019
<i>Noga Chemo, Yaniv Mordecai, Yoram Reich</i>	
Designing a Networking System for Lunar Exploration Over the Moon-Earth Link	1034
<i>Shunsuke Higuchi, Tetsu Joh, Masaki Suzuki, Chikara Sasaki, Atsushi Tagami, Yu Morinaga</i> <i>Kiyohisa Suzuki</i>	
Reinforcement Learning-Based Singularity Management for Variable-Speed Control Moment Gyroscopes	1042
<i>Ali Elmorshedy, Mohamed Okasha, Haitham Elshimy, Shamma Jamali</i>	
Low-Control Satellite Formations for Enhanced GNSS-R Resolution in Perturbed Orbits	1052
<i>Angel Pan Du, Lawanya Awasthi, M. Amin Alandihallaj, Andreas M. Hein</i>	
Value Creation Patterns in Space Program Architectures	1061
<i>Alexander Bühler, M. Amin Alandihallaj, Andreas M. Hein</i>	
Towards an AI-Augmented Monitoring and Control Applications Lifecycle Management System	1073
<i>Luigi Palladino, Francesco Croce, Diogo Vicente, Joao Silva</i>	
Enabling Localization and Mapping for Heterogeneous Robots in Orbit-to-Surface Teleoperation Setup	1086
<i>Xiaozhou Luo, Marco Sewtz, Timo Bachmann, Nesrine Batti, Sant Brinkman, Jörg Butterfaß</i> <i>Emiel Den Exter, Tristan Ehlert, Werner Friedl, Thomas Gumpert, Philipp G. Knestel, Anne Köpken</i> <i>Viktor Langofer, Florian S. Lay, Ajithkumar N. Manaparampil, Luisa Mayershofer, Antonin Raffin</i> <i>Anne Reichert, Nicole Roshardt, Annika Schmidt, Florian Schmidt, Lioba Schürmann, Daniel Seidel</i> <i>Riccardo Giubilato, Rudolph Triebel, Adrian S. Bauer, Daniel Leidner, Rute Luz, Peter Schmaus</i> <i>Thomas Krüger, Neal Y. Lii</i>	
Methods for Improving User Needs Incorporation in Conceptual Design Phases of Systems Engineering	1104
<i>Matteo Manieri, Alessandra Menicucci, Nicola De Quattro, Filippo Iodice</i>	
IMAP Safety & Mission Assurance Road to Launch & Mission Success	1116
<i>Christina M. Collura, Elfriede Dustin, Grant Miller, Anna Shin</i>	
Modelling and Testing a Real-Time Human-in-the-Loop Controlled Lunar Landing Simulator	1125
<i>Miguel Alfaro Neves</i>	
Reliable Maintenance Policy for Distributed Affine Formation Control of UAVs	1141
<i>Hongyu Zhou, Zhonggang Li, Raj Thilak Rajan</i>	
Terrain-Adaptive Strategies to Prevent and Recover from Rover Wheel-Slip	1150
<i>Jasper Grant, Mae Seto, Paul Grouchy</i>	
Near Real-Time Georectification of Satellite Imagery for Insights	1160
<i>Paulo R.M. Fisch, Ravi Teja Nallapu, Punarjay Chakravarty, Kiruthika Devaraj, Zachary Manchester</i>	
Graceful Degradation of Spacecraft Capabilities with Simulated Component Failure	1172
<i>Josef Biberstein, Sertac Karaman, Olivier De Weck, David Sternberg, Lorraine Fesq, Ksenia Kolcio</i> <i>Maurice Prather</i>	
The Current State of Satellite Constellation Security and Design Moving Forward	1183
<i>Trey Burks</i>	

Real-Time Stability Monitoring of Neural Network Based Missile Guidance	1203
<i>Kenneth McDonald, Edward Daughtery, Zhihua Qu, Trevor McCants, Jason Beck</i>	
Decadal Advancements in Technologies Supporting Active Magnetic Radiation Shields	1213
<i>Joseph Hesse-Withbroe, Katya Arquilla</i>	
Prototype of a Laser-Based Mass Spectrometer for in Situ Dating of Rocks on Planetary Surfaces	1223
<i>Peter Wurz, Reto Wiesendanger, Scott F. Anderson, Tom Whitaker, Marek Tulej, Rico G. Fausch</i>	
Development of an UAS with Geomatics and Bioinspired Features for ISR Missions	1236
<i>Rodrigo Kuntz Rangel, Mauricio Pazini Brandão, Rhacley F. F. de Araújo, Eduardo Emanuel Fonseca</i>	
Europa Clipper Cruise Phase: From Integration and Test to Early Operations	1254
<i>Andres F. Rivera, Erisa Stille, Thaddeus M. Para, May Chong Chan</i>	
A Stochastic Approach to Terrain Maps for Safe Lunar Landing	1272
<i>Anja Sheppard, Chris Reale, Katherine A. Skinner</i>	
Distributed Object Manager (DOM): Insights from Three Decades of Operating and Modernizing a Pioneering Multi-Mission Distributed Object Store for Spaceflight Missions	1282
<i>Jenette Sellin, Janine Huang, Elliot Trapp, Gustavo Razo, Richard Rangel</i>	
Automated Extraction and Cross-Document Analysis of Aerospace Project Requirements Using LLMs	1293
<i>Imededdine Ben Slimene, Maximo A. Roa, Daniel Leidner, Martin Stelzer</i>	
Vision-Language Model Informed Relative Navigation for GPS-Denied Environments	1305
<i>Alexander Pasqualina, Alison Peckham, Caleb Craddock, Sneha Laxminarayan, Katelyn Winkleblech Sandip Sharan Senthil Kumar, Harshang Chhaya, Jared Paquet, J. Humberto Ramos, Michael Anderson</i>	
Design and Implementation of the NASA Psyche Discovery Mission Science Data Center	1316
<i>Ernest Cisneros, James F. Bell, Lauren Auchterlonie, Madeline Marquardt, Michael Walworth Nathan A. Cluff, Raymond C. Espiritu, Jodie Ream, Daniel D. Wenkert</i>	
The Lunar Capillary Absorption Spectrometer (LuCAS) for Characterization of Lunar Volatiles	1327
<i>Isabel King, Frank Sheeran, Sara Mayne, Kris Zacny, Jason Kriesel, Andrew Fahrland, Emre Ozen Jennifer Stern</i>	
A Novel Laser-Ablation Resonance-Ionization Mass Spectrometer for In Situ Dating of Lunar Rocks	1335
<i>Rico G. Fausch, F. Scott Anderson, Audrey E. Aebi, Amanda M. Alexander, Edward B. Bierhaus Sarah E. Braden, Amy L. Fagan, Sierra N. Ferguson, Otso Gächter, Michela A. Gargano, Mary H. Hanson Sébastien Hayoz, James W. Head, Alex M. Iseli, Katherine H. Joy, Viliam Klein, Julie M. Korsmeyer Jonathan Levine, Steven Osterman, John F. Pernet-Fisher, Daniele Piazza, Andreas Riedo, Kevin W. Sacca Vishaal Singh, Remo Sommer, Romain Tartèse, Tina L. Teichmann, Tom Whitaker, Peter Wurz Marcella A. Yant</i>	
Carbon-I: Expanding the Frontiers of Carbon Cycle Science	1351
<i>Andrew K. Thorpe, Christian Frankenberg, Yunjin Kim, William E. Frazier, Timothy M. Linn Lockheed Martin, Anna M. Michalak, Valerie J. Scott, Sharmila Padmanabhan, K. Dana Chadwick Philip G. Brodrick, David R. Thompson, Robert O. Green, Matthew W. Smith, Christine L. Bradley</i>	
Iterative Repair for Small Satellite Power, Attitude and Mission Task Schedule Management	1362
<i>Brooklyn Beck, Ella M. Atkins</i>	
In-Space Manufacturing Viability of Nanocomposites for the Extreme Space Environment	1374
<i>Palak B. Patel, Brady Cruse, Jarrod J. Buffy, Joseph H. Koo, Valerie L. Wiesner, Brian L. Wardle</i>	

Geometry Adaptive Deep Q-Network for UAV-Based Emitter Localization in Cluttered RF Environments	1386
<i>Christopher Peters, Michael Watts, Eric C. Larson, Mitchell A. Thornton</i>	
Investigating Large Language Model-Based Decision Making for Deep Space Habitat Systems	1397
<i>Sreehari Manikkan, Maurice Reimer, Motahareh Mirfarah, Zhiwei Chu, Mohan Chi, Christian E. Silva</i>	
<i>Lalit Dongare, Ilias Bilionis, Shirley J. Dyke</i>	
Modeling the Impact of Helicopter Vibrations on the Musculoskeletal Health of Us Army Helicopter Pilots	1413
<i>MAJ Julie Johnston, Jordan Dixon</i>	
Robust Trajectory Optimization Against Missed Thrust Events Using Sequential Convex Programming	1433
<i>Hirota Sekine, Kenshiro Oguri, Yosuke Kawabata, Ryu Funase</i>	
Predicting Cognitive State and Workload of Aviators with Machine Learning of Physiological Data	1448
<i>Jeffrey Johnston, Srinivasan Radhakrishnan, Jared Shamwell</i>	
Early-Phase Design of Distributed Space Antennas and Constellations for D2D Communications	1461
<i>Seang Shim, Ryusei Komatsu, Yuta Takahashi, Hideki Yoshikado, Harunobu Kobayashi, Sumio Morioka</i>	
A Prototype Low-Cost Hybrid-Actuated Mobile Spherical Terrain Exploration Rover	1476
<i>Winnie Gao, Youyou Luo, Drew Schlauch, Stephen T. Kwok-Choon</i>	
Design of a Cold-Gas Propulsion System for the STARI Mission	1489
<i>Althea Noonan, E. Glenn Lightsey, John Monnier, James Cutler</i>	
Snow Accumulation Sounding Using C3 Class Hexacopter Integrated with FMCW Radar	1498
<i>Lee Taylor, Fernando Rodríguez-Morales, Jilu Li, Carlton Leuschen</i>	
Machine Learning Argument of Latitude Error Model for LEO Satellite Orbit and Covariance Correction	1503
<i>Alex Moody, Penina Axelrad, Rebecca Russell</i>	
Probabilistic Connectivity Analysis of Recursive Satellite Release for Formation Initialization	1515
<i>Hideki Yoshikado, Yuta Takahashi</i>	
ARISE: Continuous Port–Hamiltonian Damping at ESPA Injection for High Speed Flyby	1528
<i>Harish Vernekar, Leonard Vance, Jekan Thangavelautham</i>	
Cross-Region Mineral Mapping with Hyperspectral Data-Trained Multispectral Data Features	1541
<i>Hideki Tsubomatsu, Satoru Yamamoto, Hideyuki Tonooka</i>	
The S3LI Vulcano Dataset: A Dataset for Multi-Modal SLAM in Unstructured Planetary Environments	1550
<i>Riccardo Giubilato, Marcus Gerhard Müller, Marco Sewtz, Laura Alejandra Encinar Gonzalez</i>	
<i>John Folkesson, Rudolph Triebel</i>	
Test-Bed Development for Sensor Fusion Application for Rendezvous and Proximity Operations	1560
<i>Cristobal Garrido, David Barnhart</i>	
Performance Evaluation of TSN-Based Communication System for the Next Generation Launch Vehicle	1569
<i>Francesco G. Lavacca, Tiziana Fiori, Matteo Vallone, Cristiano Savini, Francesco Grifoni</i>	
<i>Vincenzo Eramo</i>	

A Compact, Autonomous, Submersible Holographic Microscope for Passive in-Situ Microbial Sensing	1577
<i>Alexander J. Ramirez, J. Kent Wallace</i>	
AI-Enhanced Vision-Based Hazard Detection Operations in Lunar Landing Scenario	1591
<i>Mohamed El Awag, Ludovica Cavalieri, Simone Andolfo, Fabio Valerio Buonomo, Antonio Genova</i>	
Reinforcement Learning for Closed-Loop Whole-Body Control of a Debris Capture Satellite	1606
<i>Vighnesh Vatsal, Nijil George, Rolif Lima, Kaushik Das</i>	
Cyber Resilient Provenance Tracking for Virtual Certification	1615
<i>Malte Christian Struck, Andreas Schreiber, Alexander Weinert, Paula Ruß, Michael Felderer</i>	
From Quaternions to Möbius Transformations: A Relativistic Framework for Spacecraft Star Tracking	1626
<i>Andrew Tennenbaum, John L. Crassidis</i>	
An Uncertainty-Aware Provenance Framework for Enhanced Traceability in Engineering Systems	1635
<i>Deoclecio Valente, Andreas Schäfer, Elif Tasdemir, Robert Hoppe, Oliver Bertram, Frank Dressel</i>	
Mission-Specific Trajectory Dispersions for T-SCVx Landing Guidance	1652
<i>Waylon Lee, Carson Capps, Jack Goldhammer, Gregory Chamitoff</i>	
Development of a Structural Thermal Model for a Water-Based Propulsion System on the GEO-X Mission	1661
<i>Ryo Minematsu, Ten Arai, Masaki Fujii, Minwoo Han, Hayato Yoshida, Isamu Moriai, Ryota Fuse</i> <i>Koki Ikeda, Taiki Achiha, Sanguk Jeong, Natsumi Hirota, Kenshin Yamakawa, Hiroyuki Koizumi</i> <i>Ryu Funase, Mariko Akiyama, Yuichiro Ezoe</i>	
Backpack Battery : Auxiliary Power for Dragonfly During Entry, Descent, and Landing	1669
<i>Tonlé Bloomer, Matthew Rodriguez</i>	
Using Impact Flash to Initiate Nuclear Explosive Devices in Planetary Defense Missions	1677
<i>Mark Boslough, Russell TerBeek</i>	
Low-Cost Deployment Systems for Suborbital Plasma Measurements: AURA and VECTR	1684
<i>Regan O'Neill, Lawrence Coleman, James Davis, Andrew Hodges, Matthew Hall, Steve Kaeppler</i>	
Hierarchical Out-of-Distribution Detection with Topological Data Analysis	1692
<i>Derek DeBlieck, Hongzhi Guo, Paul T. Schrader</i>	
Modeling Stochastic Process Uncertainties in Spacecraft Dynamics: A New Capability in the Basilisk Framework	1702
<i>Juan Garcia-Bonilla, Hanspeter Schaub</i>	
Distributed Reinforcement Learning for Resource Management in Satellite Edge Computing Systems	1717
<i>Camilo Rojas Milla, Nour Badini, Fabio Patrone, Juan A. Fraire, Mario Marchese</i>	
Envelope-Aware, Cascaded Altitude Controller for VTOL Via Reinforcement Learning	1725
<i>Wan Faris Aizat Wan Aasim, Mohamed Okasha, Ahmad Mahmood, Abdullah Aamir Hayat</i>	
Mobility-Resilient Datalink Protocol for Next-Generation Aeronautical Communication	1745
<i>Sergun Özmen, Raouf Hamzaoui, Hassna Louadah, Feng Chen, Fulya Aybek Cetek, Rosa Arnaldo Valdés</i> <i>Pedro Reinaldos Manzanares, Guillermo Martín Vicente, Michael Regnault</i>	
Side-Looking SAR Using 12-18 GHz FMCW Radar Integrated with C3 Class Hexacopter	1763
<i>Lee Taylor, Fernando Rodríguez-Morales, Jilu Li, Carlton Leuschen</i>	

Autonomous Reasoning for Spacecraft Control: A Large Language Model Framework with Group Relative Policy Optimization	1769
<i>Amit Jain, Richard Linares</i>	
The Engineering Challenges of Putting a Cubesat Into GTO: The Lessons of GTOSat	1783
<i>Larry Kepko, John Lucas, Dakotah Rusley, Pavel Galchenko, Steven West, Lauren Blum</i>	
Autonomous Visual-Inertial Navigation for Networked Satellites	1790
<i>Frederik Markus, Zachary Manchester</i>	
HAVEN: Hazard-Response Aero-Deployable Vehicle for Emergency Nominal Re-Entry	1799
<i>Christopher Kwon, Befin Ataman, Yuhan Wang, Shantelle Ortiz, Cody Paige, Jeffery Hoffman Skylar Tibbits</i>	
Distributed Angle-Only Relative Orbit Determination in Satellite Networks	1811
<i>Giovanni Romagnoli, Giordana Bucchioni, Giusy Falcone</i>	
AstroDOME: Standardized, Mass-Produceable, Small NASA Astrophysics Observatories for Big Missions	1822
<i>Matthew Marcus, Kan Yang, Brad Cenko, Robert Caffrey, Rita Sambruna, Aaron Peer</i>	
Over 25 Years of International Cooperation of Gravity Missions: Past, Present, Future	1834
<i>Neil Dahya, Felix Landerer, William Klipstein, Michael Gross, Omair Khan, David Wiese Christopher Mccullough, Robert Sharrow, Haley Tooper, Otfried Liepack, Brent Ware, Nico Brandt Hauke Thamm</i>	
State Space Quantification in Reinforcement Learning	1856
<i>Rodney Sanchez, Paul T. Schrader, Jamison Heard</i>	
Digital Architecture Strategy for the NASA Gateway Program	1866
<i>Josh Sung, Lillian Glaeser, Go Saito, Cody Wheeler, Jeremiah Crane, Crystal Haddock</i>	
Mission Planning Simulation and Design Software Scaling for Shared and Distributed Memory Computing	1880
<i>Sam Siewert, Angel Martinez-Sanchez, Jacob Collins, Chirag Dhamange, Stevie D. Littleton</i>	
The Exact X-Ray Positioning, Navigation and Timing Mission	1895
<i>Mel Nightingale, Kyle Houser, Lindsay Glesener, Demoz Gebre-Egziabher, Robert Plunkett, John Sample</i>	
Hosting Machine Learning Algorithms in Flight Software via the F Prime Python Software Framework	1908
<i>Matthew Alexander Mariano, Kelly Williams, Michael Pham, Zachary Gaines, Tanya Patel, Phyllis Nelson</i>	
SCALES A Dual Computing Architecture for Deploying Edge Computing Resources on Small Spacecraft	1917
<i>Michael Pham, Zachary Gaines, Matthew Alexander Mariano, Kelly Williams, Luca Lanzillotta Tanya Patel, John Pollak, Giselle Revolorio, Phyllis Nelson</i>	
Distributed Data Acquisition and Control System for Rocket Engine Static-Fire Test Stands	1926
<i>Piotr Slawecki, Hubert Kowalczyk, Mikolaj Sala, Artur Brdej, Piotr Slonka</i>	
Data-Driven Tracking Control for Origami-Tensegrity Robotic Structures	1938
<i>Connie Liou, Manan Arya</i>	
Development Status of the Inter-Spacecraft Optical Communicator	1946
<i>Jose Velazco, Brian Sheldon, Yen Wong</i>	

Verification and Validation of the Europa Clipper Launch Phase and Autonomous Behavior	1957
<i>Erisa Stilley, Carolyn Brennen, Jean-Francois Castet, Amanda Donner</i>	
Updates to the Injury Modes and Effects Analysis for Suited Lunar Surface Operations and Training	1972
<i>Aaron Drake, Teresa Reiber, Keegan Yates, Caroline Howes, Rachel Thompson, Linh Vu, Nathaniel Newby</i>	
An Open Synthetic Operational Aircraft Performance Model (SOAP)	1986
<i>Lance Bays, Michael Grenn</i>	
Verification of SpaceAGORA.jl 6-DoF Dynamics Using University of Michigan SmallSats Telemetry	2006
<i>Evan Yu, James Cutler, Giusy Falcone</i>	
An Engineering Life-Cycle Assurance Process for Autonomous Space Systems	2020
<i>Alessandro Pinto, Caleb Wagner, Klaus Havelund, Nicolas Rouquette</i>	
Thermal Management and Packaging of High-Power Polarization-Diverse Arrays Utilizing Additive Manufacturing	2040
<i>Max Tannenbaum, Dante Dimenichi, Nathan Fairlie, Wiley Holcombe</i>	
Development and Validation Status of High-Fidelity Re-Entry Analysis Tool LS-DARC	2053
<i>Keiichiro Fujimoto, Shinjiro Tsuji, Takanoobu Kamiya, Shuto Yatsuyanagi</i>	
Multi-Physics Simulation Code LS-LUCA for Innovative Space Transportation System Design	2061
<i>Keiichiro Fujimoto, Kaname Kawatsu, Hiroaki Amakawa</i>	
Visual SLAM with DEM Anchoring for Long-Range Lunar Surface Navigation	2072
<i>Adam Dai, Guillem Casadesus Vila, Grace Gao</i>	
Semantic Segmentation and Depth Estimation for Real-Time Lunar Surface Mapping Using 3D Gaussian Splatting	2081
<i>Guillem Casadesus Vila, Adam Dai, Grace Gao</i>	
Data-Driven Vibration Analysis from Vision: Optical Flow ML for Terrain Monitoring	2095
<i>Abdullah Aamir Hayat, Mohamed Okasha</i>	
Air-to-Air Channel Characterization for UAV Communications at 3.4 GHz	2102
<i>Anıl Gürses, John Kesler, Mihail L. Sichitiu</i>	
Optimization of Machine Learning Methods for Predicting G-Induced Loss of Consciousness	2108
<i>Nicole C. Rote, Aaron R. Allred, Christopher Dooley, Charles Fechtig, Kim Cates, Allison P. A. Hayman</i>	
Beyond the Bid: Navigating the Risks of Using Commercial Spacecraft for NASA Missions	2121
<i>Rebecca Kelly, Andrew Driesman</i>	
Highlights of the IMAP Integration and Test Campaign	2127
<i>Justin Hahn, Sarah Bucior, Rosanna Smith, Evan Smith, Musad Haque</i>	
Mars Deep Subsurface Exploration with an Integrated Drill and Instrument Suite	2136
<i>Joseph Palmowski, Kris Zacny, Kathryn Bywaters, Kevin Hubbard, Leo Stolov, Evan Eshelman, Robert May Nicholas Naclerio</i>	
Tiled Plate Solving and Distortion Correction for Robust Star Tracking in WFOV Imagery	2143
<i>Gabriela Gavilanez, Daniel Lopez, Khushboo Patel, Andrew Murphy, Samuil Nikolov, Dori Stein Alvin Pujols, Shivansh Soni, Troy Henderson</i>	

Initial Study of a Physics-Based Virtual Assistant for Real-Time Fault Diagnosis in Space Habitats	2153
<i>Kazuki Toma, Joshua T. Elston, David Kortenkamp, Daniel Selva</i>	
Review, Design, and Comparative Analysis of Microspine Gripper Technologies for Asteroid Attachment	2168
<i>Michael Akers, Megan Michaud, Michael C.F. Bazzocchi</i>	
Resilient UAV Data Mule via Adaptive Sensor Association Under Timing Constraints	2177
<i>Md Sharif Hossen, Anil Gurses, Ozgur Ozdemir, Mihail Sichitiu, Ismail Guvenç</i>	
Real-World LoRaWAN Performance and Propagation Modeling Using UAV, Helikite, and Vehicle-Based Measurements	2190
<i>Sergio Vargas Villar, Simran Singh, Ozgur Ozdemir, Mihail Sichitiu, İsmail Güvenç</i>	
Effects of Radiation on Photosensitive Instruments While Traversing the Van Allen Belts	2203
<i>Aiden McCollum, Emelia Kelly, Daniel Lopez, Troy Henderson</i>	
Replacement Reality: Driving on Earth While Dreaming of the Moon	2213
<i>R. Michael Swan, Marcus Koh, Juan Garcia-Bonilla, Asher Elmland, Georgios Georgakis, Ashish Goel Brandon Rothrock, Michael Paton, Masahiro Ono, Hari Nayar, Issa Nesnas</i>	
Modeling and Analysis of Air-to-Ground Cellular KPIs in a 5G Testbed Using Android Smartphones	2225
<i>Simran Singh, Anıl Gürses, Özgür Özdemir, Ram Asokan, Mihail L. Sichitiu, İsmail Güvenç, Rudra Dutta Magreth Mushi</i>	
PULSE-A: Polarization-Modulated Optical Communications at the CubeSat Form Factor	2238
<i>Logan Hanssler, Juan Ignacio Prieto Asbun, Seth Knights, Sofia Mansilla, Everette Spencer Shelton Catherine Todd, Elizabeth Rosario, Graydon Schulze-Kalt, Leah Vashevko, Daniel Lee, Robert Pitu Rodrigo Spinola e Castro, Aidan Etterer, Akash Piya, Brian Yu, Vidya Suri, Lauren Ayala, Rohan Gupta Mason McCormack, Vincent Redwine, Danielle Zumi Riekse, Michael Lembeck, Tian Zhong</i>	
Exploratory Design of an Extended Reality UAV Path Planning Tool	2252
<i>Luljeta Sinani, Frank Steinicke, Andreas Gerndt, Georgia Albuquerque</i>	
Accelerating the Pre-Silicon Functional Verification Value Ramp Using Aspect Oriented Development	2264
<i>Hamilton Carter</i>	
The SpaceVNX+ Standard for Small Form-Factor, Modular Electronics for Space Applications	2272
<i>Steve Parkes, David Givens</i>	
Toward Improving Task-Level Commanding in Space Robotics Teleoperation Through Shared Mental Models	2279
<i>Luisa Mayershofer, Florian S. Lay, Nesrine Batti, Sant Brinkman, Jörg Butterfaß, Tristan Ehlert Emiel Den Exter, Werner Friedl, Thomas Gumpert, Anne Köpken, Xiaozhou Luo Ajithkumar N. Manaparampil, Antonin Raffin, Annika Schmidt, Florian Schmidt, Lioba Schürmann Daniel Seidel, Rute Luz, Adrian S. Bauer, Peter Schmaus, Daniel Leidner, Thomas Krüger, Neal Y. Lii</i>	
Radioisotope Power Systems (RPS) Deployment and Integration Into Future Missions	2294
<i>Young H. Lee, John Elliott, Benjamin Marti, Michael G. Fifield, Allen T. Guzik, Salvatore M. Oriti Scott D. Wilson, Stephen G. Johnson, Steven R. Vernon, June F. Zakrajsek, Paul Schmitz</i>	
Closed-Loop Modeling and Simulation of Phase-Shift Full-Bridge Converter with Current Doubler Output	2309
<i>Kasemsan Siri, Joshua Stewart, Markell Hardee, Natan Ranjbar</i>	

Security Challenges in Space-Based Delay Tolerant Networks	2319
<i>Mohammad Abdus Salam, Robert Short</i>	
Beyond the Bid: Unpleasant Surprises in Firm Fixed Price Spacecraft Contracts on NASA Missions	2329
<i>Rachel Sholder</i>	
Geometric Interpretation of Quantum-Optimum Detection for Weak Optical Signals	2339
<i>Victor Vilnrotter</i>	
Mission Concept to Track Convective Cloud Systems With Satellite-Based Phased-Array Radars	2354
<i>Jean F. Ghantous, Christopher Williams</i>	
Vision Beyond Earth: Synthetic Satellite Data for Neural Perception in Orbit	2364
<i>Marcus G. Müller, Wout Boerdijk, Maximilian Ulmer, Wolfgang Stürzl, Abel Gawel, Roland Siegwart Rudolph Triebel, Maximilian Durner</i>	
The First Open-Source Framework for Learning Stability Certificates from Data	2378
<i>Zhe Shen</i>	
Elevation-Aware BLER-Centric Link Adaptation for Dynamic LEO 5G NTN Systems	2386
<i>Eric Forbes, Ethan Silverstein, Ying Wang</i>	
Enabling Autonomous eVTOL Communications: Challenges, Solutions, and Future Directions	2394
<i>Bing Mak, Ishan Aryendu, Ying Wang</i>	
SpaceFibre Evolution: 100 Gbps with Low-Overhead SoC Integration	2402
<i>Alberto Gonzalez Villafranca, Albert Ferrer Florit, Marti Farras Casas, Dave Gibson, Andrew MacLennan Stuart Mills, Steve Parkes</i>	
A General Purpose Method for Robotic Interception of Non-Cooperative Dynamic Targets	2409
<i>Tanmay P. Patel, Erica L. Tevere, Erik H. Kramer, Rudranarayan M. Mukherjee</i>	
Mirrored Surface Use and Measurement in Spacecraft Assembly and Test	2420
<i>Robert Elliott</i>	
A Framework for Scenario Generation, Training, and Evaluation of Neuro-Symbolic AI for Autonomy	2428
<i>Hambisa Keno, Nicholas J. Pioch, Christopher Guagliano, Timothy H. Chung, Gautam Vallabha Chace Ashcraft</i>	
TCP Performance Analysis for Cislunar Networks	2440
<i>Qinqing Zhang, Ayush Dusia, Yow-Jian Lin, Joseph Ishac, Sandra Schroeder</i>	
Towards Robust 6D Pose Tracking for On-Orbit-Servicing with Learned Segmentation and Motion Priors	2457
<i>Anne E. Reichert, Maximilian Ulmer, Margherita Piccinin, Daniel Eklund, Harald Haglund, Daniel Schenk Maximilian Durner, Rudolph Triebel</i>	
A Comparative Analysis of Measured and Simulated Multipath Effects on Satellite Tracking Error	2471
<i>Rodrigo Negri de Azeredo, Lara Thomas, Stéphane Victor, Patrick Lanusse, Pierre Melchior</i>	
Cryo-Compatible Robotic Actuators with Use of Superconducting Materials	2484
<i>Daniel Chavez-Clemente, Asad M. Aboobaker</i>	

Venus Atmospheric Structure Investigation (VASI) on the DAVINCI Probe: 4 Years Post-Selection	2496
<i>Ralph D. Lorenz, Xiaoyi Li, Stephanie Vidal, Mitchell Haglund, Robert Moss, Austin Lanham</i>	
<i>Joseph Galante, Dewey Willis</i>	
Distributed Area Coverage with High Altitude Balloons Using Multi-Agent Reinforcement Learning	2511
<i>Adam Haroon, Tristan Schuler</i>	
Landsat Next Instrument Suite Image Processing & Compression Pipeline - From Photons to Bits and a Story of Data Cubes	2525
<i>P. Phelan, M. Koets, J. Hanley, J. Ford, A. Pozo, A. Bashir, M. Sarakasetrin, D. Keymeulen, M. Klimesh</i>	
<i>S. Burchfiel, M. Mihaly, D. Dolman</i>	
It's a Dirty Job: Defining and Mitigating Dust and Sand Hazards on the Dragonfly Mission to Titan	2538
<i>Ralph D. Lorenz</i>	
Assessment of Grail Radio Science Signal Noise Patterns in Support of Lunar Radio Occultation	2550
<i>Yu-Ming Yang, Kamal Oudrhiri, Paul Withers, Daniel Erwin, Dustin Buccino</i>	
Orion Artemis II Optical Communications Architecture, Implementation and Test Systems	2556
<i>Peter Rossoni, Farzana Khatri, Bryan Robinson, RJ McGraw, Chris Finegan, Jonathon King, Mike Bay</i>	
<i>Bob Schulein, Jeff Zinchuk, Nikki Desch</i>	
Fission Surface Power Technology Readiness Assessment - An Overview	2565
<i>Vincent J. Bilardo</i>	
MH-60R Helicopter Desktop Two-Seat Crew Simulator and Trainer	2572
<i>Robert Richards</i>	
Integrated Attitude Control Architecture for Manipulator-Equipped SmallSats	2579
<i>Bartłomiej Koszek, Laila Kazemi, Emese Kovács</i>	
HexSense Lunar Mapping: Deployable 360 Cameras for Panoramic Inspection & 3D Reconstruction	2590
<i>Fangzheng Liu, Nicolas STAS, Ariel Ekblaw, Joseph A. Paradiso</i>	
PIKAN: Physics-Inspired Kolmogorov-Arnold Networks for Explainable UAV Channel Modelling	2598
<i>Kürşat Tekbilyk, Güneş Karabulut Kurt, Antoine Lesage-Landry</i>	
Orbital Optimization of a Distributed Heliocentric Relay Network for Mars-Earth Communications	2613
<i>Jules Pénot, Hamsa Balakrishnan</i>	
GoDSAT: Reinforcement Learning Based Satellite Constellation Sensor Tasking Framework	2631
<i>Amir K. Saeed, Alhassan S. Yasin, Nicholas A. V. Realuyo, Benjamin A. Johnson, Benjamin M. Rodriguez</i>	
Trussed Deployable Structures That Enable Rendezvous & Proximity Operations	2640
<i>Ryan Rickerson, Toby Harvey</i>	
Microchannel Plate Detectors for High-Resolution Remote Sensing and Space Surveillance Applications	2647
<i>Camden D. Ertley, Oswald H. W. Siegmund</i>	
Using a Single Imager and Structured Light for High Resolution and Accurate 3D Mapping of Microscopic Terrain on Mars	2659
<i>David Arge Klevang, Jonas H. Nielsen, Jesper Henneke, Lawrence A. Wade, Peter Nemere, Chaz Morantz</i>	
<i>Peter S. Jørgensen, Nick Tallarida, Mathias Benn, David Flannery, Nicolas Randazzo, Troelz Denver</i>	
<i>John L. Jørgensen, Morgan Cable, Joel Hurowitz, Abigail Allwood</i>	

Mission Life Enhancing Studies and Results for the Imaging X-Ray Polarimetry Explorer (IXPE)	2668
<i>William Bill Kalinowski, Jenny Gubner, Zach Allen, Eli Gurnee, Kevin Ferrant, Stephanie Ruswick Wes Hoffert, Andrew Gorsky</i>	
Constant-Envelope Multicarrier Modulations vs. Multicarrier Modulations in Non-Terrestrial Network Scenarios	2682
<i>Claudio Sacchi, Alberto Tarable, Giuseppe Virone, Simone Morosi, Consorzio Nazionale</i>	
NASA SimuPy-Based Spacecraft Fault Reliability Diagnostics Framework Using Machine Learning	2701
<i>Vishnupriya S Devarajulu, Austin W. Lindquist, Santosh Reddy Addula, Sunitha Kanipakam</i>	
Time-Frequency Wavelet Transformer Forecasting for Hypersonic Glide Vehicle Trajectory Prediction	2713
<i>Marina Kurilova, Howard Li</i>	
Interplanetary Generalization and Adaptation of Deep Stereo on Mars	2727
<i>Yifei Liu, Brandon Rothrock, R. Michael Swan, Hosei O, Sebastian Scherer, Masahiro Ono</i>	
Entity Resolution for Aircraft Type Matching on Heterogeneous Aviation Data Sources	2740
<i>Karna Bryan, Irene Tsapara</i>	
Challenges in Finding Large Near-Earth Objects	2750
<i>Richard Wainscoat</i>	
Human as an Actuator Dynamic Model Identification	2756
<i>Harrison M. Bonner, Matthew R. Kirchner</i>	
RGB-NIR Reflectance and 3D Microtopography for Lunar Regolith Analysis Using ToF Imaging Systems	2761
<i>Don D. Haddad, Cody Paige, Ariel Ekblaw, Joseph A. Paradiso, Dava J. Newman, Amanda Cook Ariel N. Deutsch, Jennifer Heldmann, Anthony Colaprete</i>	
AI-Driven Design of Stacked Intelligent Metasurfaces for Software-Defined Radio Applications	2768
<i>Ivan Iudice, Giacinto Gelli, Donatella Darsena</i>	
RISs as Enablers for Adaptive and Modular Space Communication Architectures	2776
<i>Ivan Iudice, Domenico Pascarella, Sonia Zappia, Vincenzo Galdi</i>	
Enhancing Scalable Autonomy Space Teleoperation with User Intervention During Task Execution	2788
<i>Ajithkumar Narayanan Manaparampil, Anne Koepken, Luisa Mayershofer, Nesrine Batti, Xuwei Wu Harsimran Singh, Michael Panzirsch, Florian S. Lay, Xiaozhou Luo, Anne Reichert, Timo Bachmann Philipp G. Knestel, Lioba Schürmann, Annika Schmidt, Antonin Raffin, Tristan Ehlert, Daniel Seidel Sant Brinkman, Nicole Roshardt, Emiel Den Exter, Jörg Butterfaß, Florian Schmidt, Werner Friedl Thomas Gumpert, Adrian S. Bauer, Rute Luz, Peter Schmaus, Daniel Leidner, Thomas Kruger, Neal Y. Lii</i>	
Exploring Rapid-Response Flyby Reconnaissance Mission Architectures Enabling Asteroid Mass Estimation	2804
<i>Evan Smith, Justin Atchison, Joseph Linden, Pegah Pashai, Benjamin Villac, Elisabeth Abel, Rylie Bull Michelle Chen, Terik Daly, Collette Gillaspie, Taejoo Lee, Matthew Rodriguez, Thomas Ruekgauer Rachel Sholder, Ronald Smith, Connor Thompson</i>	
LunarLoc: Robust Global Localization for Autonomous Surface Operations on the Moon	2817
<i>Annika Thomas, Aleksander Garbuz, Trevor Johst, Keerthana Srinivasan, Dami Thomas, Cormac O'Neill Robaire Galliath, George Lordos, Jonathan P. How</i>	

Incompressible by Design: IMAP End-to-End Testing	2828
<i>Musad Haque, Evan Smith</i>	
Hierarchical Community Detection and Routing on Networks with Forman-RICCI Curvature and Flow	2838
<i>Oliver Chiriac, William Harris, Chloe He, Brian Foo</i>	
Monocular Depth Estimation for Spacecraft: Combining Relative and Scale Information	2852
<i>Siddharth Singh, Hyo Sang Shin, Leonard Felicetti, Antonios Tsourdos</i>	
Wide-Temperature Design and Characterization of a SiGe BiCMOS Operational Amplifier for Aerospace Applications	2860
<i>Alex R. Seaver, Steven Corum, Benjamin J. Blalock, Guofu Niu, Michael Hamilton, Ergen Tao, Yiming Fan Harshil Goyal, John Li, John D. Cressler, Zachary R. Brumbach, Linda Del Castillo, Mohammad Mojarradi</i>	
Miniaturized French Instruments for in-Situ Missions	2879
<i>Gabriel Pont, Pierre W. Bousquet, Arnaud Dufour, Nourdine Kerboub, Guillaume Rioland Cédric Virmontois, Charles Yana</i>	
Mission-Oriented Site Selection for Future Lunar Mining Operations	2890
<i>Ebru Tulu, Yaömür Arzum Kaya</i>	
Range-Calibrated Anomaly Prediction for Spacecraft Data using Multi-Head Attention and GRUs	2909
<i>Shivanjali Khare, Orion Duffy, Kenneth Yao</i>	
Autonomous Verification of Magnetometer Orientation and Magnetorquer Polarity for Small Satellite Missions	2918
<i>Srianish Vutukuri, Aiswarya Sivaprasad, Gavin Futardo</i>	
Intelligent Defect Detection and Identification for Additive Manufacturing Systems	2934
<i>John S Poindexter, Seong Hyeon Hong</i>	
Demonstrating Digital Twin Interoperability Between Heterogeneous Platforms Via Spatial Web	2943
<i>Alicia Sanjurjo Barrio, Bingbing Li, Edward Chow, Thomas Lu</i>	
Untethered-Interference Cancellation by a Simultaneous Jamming and Communication Terminal	2951
<i>Bruce McGuffin, Keith Forsythe, Kenneth E. Kolodziej</i>	
System Design of a Cis-Lunar Communications and Navigation Testset	2964
<i>E. Grayver, D. Lee, E. McDonald, Jonathan P. Verville</i>	
The Design and Performance of the BAE Systems FASTER Hyperspectral Microwave Radiometer	2977
<i>David Newell, David Draper, Benjamin Davis, John Galantowicz, Allison Zapalac, Pan Liang</i>	
AI for Dynamic Environments and Exploration Using Deep Reinforcement Learning and FPGAs	2984
<i>John C. Porcello</i>	
Composite Structure Enabling an Efficient Lunar Surface Habitat	2997
<i>Matthew Ziglar</i>	
Development of a Ground Test Protocol for Human-in-the-Loop Evaluations of Drivable Lunar Terrain Vehicle Engineering Development Units	3005
<i>Harry L. Litaker, Omar S. Bekdash, Tyler G. Akker, Marcum L. Reagan, Ross J. Pettinger, Jeffrey M. Royer Christopher M. Re, Jonathan J. Lutz, Adrienne M. Ondrusek</i>	

In-Situ Resource Utilization for Mars Terraforming Nano Particle Material	3027
<i>Tatsuwaki Nakagawa, Michael H. Hecht, James Nabity, Edwin S. Kite</i>	
Nonlinear Stability Analysis of the Psyche Spacecraft Attitude Control System	3041
<i>Junette Hsin, Mollie Johnson, Alex Manka, Luis Sentis</i>	
Lunar Relay Ground Stations	3048
<i>Alexander L. Ford</i>	
Observability Analysis of Simultaneous Localization & Calibration for Cooperative Radio Navigation	3053
<i>Alexis Marino, Robert Pöhlmann, Emanuel Staudinger</i>	
A Lyapunov-Based Magnetorquer-Only Sun-Pointing Controller	3062
<i>Paulo Fisch, Pedro Cachim, Max Holliday, Rodrigo Ventura, Pedro Lourenço, Zachary Manchester</i>	
Low-Voltage, Repairable EDS Coating for Lunar Dust Mitigation on EVA Spacesuit Textiles	3077
<i>Keerthana Srinivasan, Sasha Przybylski, Rakesh P. Sahu, P. Ravi Selvaganapathy, Solomon Boakye-Yiadom</i>	
Expanding Venus Entry Accessibility through a Resonance Transfer	3091
<i>Maxwell Jacobson, Ye Lu</i>	
RAD-TECH: A Research Portfolio to Enable State-of-the-Art Electronics in Radiation Environments	3102
<i>John Dickinson, Reza Arghavani, James Bartz, Collin Burt, Matthew Cannon, Joseph D'Amico</i> <i>Nathaniel Dodds, David Hughart, Josh Joffrion, David S. Lee, Nathaniel Matter, Colin McKay, Phil Oldiges</i> <i>Paul Thelen</i>	
Coupled Multi-Unicouple Modeling for RTG Performance Prediction Under Material Uncertainty	3111
<i>Eden Brunner, Matthew M. Barry</i>	
SLAP: Slapband-Based Autonomous Perching Drone with Failure Recovery for Vertical Tree Trunks	3118
<i>Julia Di, Kenneth A. W. Hoffmann, Tony G. Chen, Tian-Ao Ren, Mark Cutkosky</i>	
Progress Towards a Near-Unity Fill Factor FIR Thermopile Detector for Space-Based Remote Sensing	3128
<i>Ricardo Braga Nogueira Branco, Byeong H. Eom, Brian Pepper, Matthew E. Kenyon</i>	
Correlation-Informed Time-Series Forecasting and Anomaly Detection	3134
<i>Lauren Bailey, James Carnal, Jamie Coble, Xingang Zhao</i>	
Mitigating Aviation Maintenance Challenges: A Technical Evaluation of AI-Enabled Sustainment	3145
<i>Christopher Reese, Max Xu, Scott Nicholson</i>	
In-Situ Manufacturing of Conformal Fillers for High-Stress Underground Arch Restoration	3155
<i>Madison C. Feehan, Timothy Anderson</i>	
Detecting Craters in Images Using Machine Learning and Classical Techniques for Lunar Navigation	3170
<i>Trupti Mahendrakar, Kyle Smith, Davis Adams, Shaurya Gupta, Max Marshall, Jorge Chong, Sofia Catalan</i>	
NiMEx: Smart Rover Swarms for Concurrent Mars Missions and Adaptive Role Reassignment	3183
<i>Nidhi D. Mandrekar</i>	
WESAT Mission: Solar Irradiance and UV Index Variability in Space vs Ground in Trivandrum, India	3190
<i>Lizy Abraham, Resmi R, Surya Jayakumar</i>	
Linearized UC1875 PWM Controller in Phase-Shifted Full-Bridge Current-Doubler-Output Converters	3198
<i>Natan Ranjbar, Kasemsan Siri</i>	

Analysis of Cost-Effective Lunar Positioning Constellation with Heterogeneous Satellites	3205
<i>Sae Ogoshi, Yosuke Kawabata, Kenshiro Oguri, Satoshi Ikari, Ryu Funase, Shinichi Nakasuka</i>	
Design Considerations for Wide-Temperature Analog LVRs with Emitter-Follower SIGe HBT Pass Devices	3217
<i>Steven Corum, Alex R. Seaver, Langdon Skarda, Colin Sylvester, Shawn Newman, Nolan Robinson Benjamin J. Blalock, Guofu Niu, Michael Hamilton, Ergen Tao, Yiming Fan, Harshil Goyal, John Li John D. Cressler, Zachary R. Brumbach</i>	
Accelerating FPGA-Based SoC Development for Reaction Wheels Using Open-Source Tools	3229
<i>Yari Nys, Cedric Cuypers, Niel Deckers</i>	
Development of an Agile Mission Concept Formulation Framework	3240
<i>Kinga Sylwia Wrobel</i>	
Hybrid-Constrained Multi-Agent Reinforcement Learning for Collaborative Dual-Aircraft Scenarios	3253
<i>Hao Liang, Yang Gao, Hui Chang, Zhijun Zhao, Shaojia Xi</i>	
From Ground Tests to Orbit: ECSS Error Characterization of SentinelTRAC	3266
<i>Laila Kazemi, Colin Huber, Vincent Yim</i>	
Deep Learning Based Anomaly Detection for Securing ADS-B in Nextgen Aviation	3274
<i>Andrei Gurtov, Jayesh Dinesh Kenaudekar, Suleman Khan, Flavio Luiz Dos Santos De Souza</i>	
Uncertainty in Orbit: Bayesian Spatiotemporal Modeling of Orbital Debris Proliferation	3287
<i>Rachel Sholder</i>	
Establishing a Self-Sustaining Lunar Data Economy through Commercial Data Markets	3305
<i>Jacob Matthews</i>	
Analysis of GEMM Implementations Using MIMD-Based Processor for Multi-Function ISAC Systems	3312
<i>Saqib Siddiqui, Arindam Dutta, Thang Pham, Daniel W. Bliss</i>	
Maneuver Detection Based Adaptive Transition Probability Matrix for Improved IMM Estimate	3321
<i>Bibhabasu Mondal, Viji Paul Panakkal, Rajbabu Velmurugan, A Vengadarajan, A.K. Pathak</i>	
Ad-Hoc UCV Resource Provisioning for UA Missions: A KPI Assessment Tool	3332
<i>Flavio Luiz dos Santos deSouza, Zelong Wang, Andrei Gurtov, Lourenco Alves Pereira Junior</i>	
Extended Linear Quadratic Regulator Informed RRT*	3343
<i>Xavier Kipping, Jordan D. Larson, Ali Pakniyat</i>	
Structural and Thermal Analysis of a Lithium Battery for Interceptor Missile AFTS Application	3358
<i>Steven Karpov, Timothy Anderson</i>	
A Robust Feedforward Symbol Timing Recovery Algorithm for Burst-Mode Satellite Communications	3370
<i>Len Yip</i>	
Novel Suite of Sensors for Recording Spatial, Temporal, and Spectral Optical Lightning Signals	3377
<i>Grant Soehnel, Garrett Giddings, Steve Brown, Grace Dean</i>	
Earth's Magnetopause Positions in Solar Wind Density-Velocity Space from 1963-2025	3387
<i>Scott Carpenter, Remy Xie, Matthew Qi, Skyler Mao, Sophia Hu, Daniel Chen, Elena Yu Mingyuan William Tang, Ranya Zhang, Emma Yu, Seabert Mao, Siuwa Andy Yang, Mingze Michael Tang Zehan Luca He, William Sun, David Wu, Brayden Quo, Cherry Chen, Ziqing Angela Tang</i>	

UrbanNav: A Comprehensive Simulation Framework for Urban Air Mobility Research	3403
<i>Aadit-Farhan Khan, Adam Haroon, Yasser Shoukry, Cody Fleming</i>	
Development of an Immersive Orion Docking Simulator with Vestibular Perturbations	3415
<i>John Hayes, Connor Jakubik, Nancy J. Currie-Gregg</i>	
Farside Seismic Suite: Status Update and Plans	3432
<i>Asad M. Aboobaker</i>	
Simple Data Model Approach to Integrate Face® Software Applications Designed from Disparate DSDMs	3438
<i>Travis Rogers, Ryan Wolfe, Scott Tompkins</i>	
Model Rocket Performance Analysis Platform	3444
<i>Aziz Yiğit Can Durmuş, Onur Safa Aygün, Berkay Doğan</i>	
Olfactory Brain-on-Chip in Microgravity for Accelerated Aging and Drug Discovery	3456
<i>Vivian C. Norris, Jerry Yang Olfera, Zara M. Patel, Kelvin Cooper, Sandeepa Dey, Parnian Lak</i>	
Physics-Informed Machine Learning for Life Assessment of Aerospace Structures Under Fatigue	3466
<i>Kunal, Pritam Chakraborty</i>	
Trajectory-Aware Handover Strategies in Space-Air-Ground Networks for Drone Deliveries and Air Taxis	3480
<i>Siri Vennela Geddam, K L V Sai Prakash Sakuru, Sruthi Ilapuram, Kamesh Namuduri</i>	
A Novel Q-Learning Architecture for Non-Stationary Markov Decision Processes	3488
<i>Daniel Clancy, Natalie Fitch</i>	
Transforming a Technology Demonstration into a Rapid Reusable Platform for Sensing Maturation	3503
<i>Steven Brown, Tyler Hoover, Lena Lopez</i>	
Resource and Power Overhead of Automated TMR for SRAM FPGAs in Space	3512
<i>Nicholas Schmidt, Alan George</i>	
Bringing Federated Learning to Space	3522
<i>Grace Ra Kim, Filip Svoboda, Nicholas D. Lane</i>	
Onboard Transformer-Based Lossless Neural Compression on Satellite Imagery	3537
<i>Jefferson Boothe, Ian Peitzsch, Evan W. Gretok, Alan D. George</i>	
Picture Your Satellite in Space: A Hybrid Rendering Framework for Physically Based Space Images	3546
<i>Daniel Schenk, Jan Christoph Wulkop, Maximilian Ulmer, Andreas Gerndt, Georgia Albuquerque</i>	
Status of Current L3Harris Technologies RTG Programs	3558
<i>Leo Gard, Andrew Lane</i>	
A New Dataset and Performance Benchmark for Real-time Spacecraft Segmentation in Onboard Computers	3566
<i>Jeffrey Joan Sam, Janhavi Sathe, Nikhil Chigali, Naman Gupta, Radhey Ruparel, Yicheng Jiang Janmajay Singh, James W Berck, Arko Barman</i>	
A Labeled Multi-Bernoulli Filter with RK4 Propagator for Orbital Debris Tracking	3576
<i>Atri Bhattacharjee</i>	

Trajectory Optimization for Free-Flying Robots in Microgravity Using Convex Obstacle Representation	3586
<i>André Rebelo Teixeira, Rodrigo Ventura</i>	
Multi-Agent Mental Models for Cooperation of Heterogeneous Robots in a Space Scenario	3594
<i>Adrian S. Bauer, Sant Brinkman, Anne Köpken, Nesrine Batti, Timo Bachmann, Jörg Butterfaß</i>	
<i>Tristan Ehlert, Emiel Den Exter, Werner Friedl, Thomas Gumpert, Philipp G. Knestel, Florian S. Lay</i>	
<i>Xiaozhou Luo, Ajithkumar N. Manaparampil, Luisa Mayershofer, Antonin Raffin, Anne Reichert</i>	
<i>Annika Schmidt, Florian Schmidt, Lioba Schürmann, Daniel Seidel, Nicole Roshardt, Michael Beetz</i>	
<i>Rute Luz, Peter Schmaus, Daniel Leidner, Thomas Krüger, Neal Y. Lii</i>	
Flexible FPGA Accelerator for Real-Time Neuromorphic Optical Flow in Space Applications	3607
<i>Linus Silbernagel, Daniel C. Stumpp, Alan D. George</i>	
Revectoring a Mission Post-Launch: The AFRL's XVI Mission, Operations and Lessons Learned	3622
<i>Erika A. Chavez, Andrew A. Knuth, Lee Jasper, Adam T. Reinelt</i>	
Investigation of Neuromorphic Sensing and Processing for Moving Object Detection	3631
<i>Douglas Carsow, Linus Silbernagel</i>	
Digital Regenerative Ranging Implementation with Accelerated Acquisition for Testbeds and Next-Gen Spacecraft	3642
<i>Eugene Grayver, Michael A. Varner, Jason Zheng</i>	
Inter-Satellite Link Configuration for Fast Delivery in Low-Earth-Orbit Constellations	3650
<i>Arman Mollakhani, Jerayu Tiamraj, Shu-Jie Cao, Dongning Guo</i>	
Neuro-Symbolic Foundation Agent for Hyperparameter Tuning in Multi-UAS Positioning	3659
<i>Yajie Bao, Deeraj Nagothu, Dan Shen, Genshe Chen, Samson Badlia, Simon Khan, Erik Blasch</i>	
<i>Khanh Pham</i>	
Hybrid BEMT-Vortex Theory Model to Predict Amphibious Propeller Performance	3668
<i>Md Umar Farooq, Sayani Biswas, Jagadeesh Kadiyam</i>	
CubeSat Drone: The Development of a CubeSat Experimental Testbed	3678
<i>Miguel A. Nunes, Pedro Casau</i>	
Commercial Orbit Transfer Services to Facilitate Lunar and Martian Exploration	3686
<i>Matt Costello</i>	
Dual-Path Framework with Uncertainty Awareness for Robust Spacecraft Pose Estimation	3696
<i>Fulin Peng, Yunmeng Liu, Lei Ding</i>	
Quarry-Bot: Mobile Telescopic Dragline Robot for Lunar Excavation	3706
<i>Zahir Abram Castrejon, Nathan Kassai, Paul Oh</i>	
Simulink-Flight Software Bridge for Model Based Testing	3715
<i>Sherif Matta, Marc Carbone</i>	
Seeking a Just Culture in Space Mission Assurance	3721
<i>Barbara Braun</i>	
A Software-Based Approach to Radiation Mitigation for Planetary Missions	3728
<i>Jeremy Nash, Vandi Verma, Evan Graser, Haoda Wang, Gerik Kubiak, Mark Maimone, Steven Myint</i>	
<i>Jeffrey Biesiadecki, Philip Romano</i>	

BOOST Converter Performance Optimization for Microsatellite Power Systems Using MPPT Fuzzy Control	3746
<i>Abdelkader Hadj-Dida</i>	
Compact Coronagraph 2 (CCOR-2) Program Overview with Integration and Test Lessons Learned	3755
<i>Timothy Babich, Cameron Crippa, Julius Verzosa, Arnaud Thernisien, Bang Nguyen, Samuel Brown</i>	
<i>Damien Chua, Robin Colaninno, Mario Noya, Don Gardner, Andrew Lanagan, Natsuha Kuroda</i>	
<i>Laura Chippeaux, Eric Rossland, Jane Li, Elias Wilcoski, Linda Smith</i>	
A Systems Engineering Approach to Mitigating Starship Cryogenic Boil-Off for Artemis III	3767
<i>George Lordos, Daniel Rojas, Beverly Ma, Stone Smith, Pranav Bala, Nicole Ding, Olivier de Weck</i>	
<i>Jeffrey Hoffman</i>	
LDPC Decoding Acceleration Architecture on Versal AI Edge for Space Platforms	3782
<i>Noah Perryman, Sebastian Sabogal, David Wilson, Christopher Wilson, Bert Vermeire</i>	
Enabling Reliable, Fault-Tolerant Autonomous Lunar Habitats with High-Performance Spaceflight Computing	3794
<i>Sarkis S. Mikaelian</i>	
Mitigating Single-Event Functional Interrupts in the Peripheral Circuitry of Non-Volatile Memories in Radiation Environments	3803
<i>Daniel Puckett, Henri Malahieude, Joseph D'Amico, Josh Joffrion</i>	