

2006 IEEE Aerospace Conference

**Big Sky, Montana
4-11 March 2006**

Volume 1 of 9



IEEE Catalog Number:
ISBN:

06TH8853
0-7803-9545-X

**Copyright © 2006 by The Institute of Electrical and Electronics Engineers, Inc.
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 republications permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, New Jersey USA 08854. All rights reserved.

IEEE Catalog Number: 06TH8853
ISBN: 0-7803-9545-X
ISSN: 1095-323X

Additional Copies of This Publication Are Available from:

IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854
IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854
Phone: (800) 678-IEEE
 (732) 981-1393
Fax: (732) 981-9667
E-mail: customer-service@ieee.org

Table of Contents

Nanotube-based Molecular Motors	1
<i>Alex Zettl</i>	
Operationally Responsive Space (ORS)	3
<i>William N. McCasland</i>	
Embryonic Stem Cell Research	5
<i>James Thomson</i>	
Hurricanes: Nature’s Dangerous Beauties	7
<i>Greg Holland</i>	
A Microscopic View of Dinosaurs	9
<i>John “Jack” Horner</i>	
The Spitzer Space Telescope: The Infrared Universe Revealed	11
<i>Michael Werner</i>	
Project Starchaser	13
<i>Steve Bennett</i>	
SILVRCLAW II Analysis, Prototype Development, and Testing	15
<i>Greg S. Mungas, David Fisher, Christopher Mungas, Benjamin Carryer, Dimi Apostolopoulos, Stuart Heys, Michael Wagner and James Teza</i>	
Improved Target Handoff for Single Cycle Instrument Placement	24
<i>Richard Madison</i>	
Humanoids in Support of Lunar and Planetary Surface Operations	37
<i>A. Stoica and D. Keymeulen</i>	
Mobile Science Platforms for Impassable Terrain	44
<i>Steven A. Curtis, Matt Brandt, Gregory Bowers, Gary Brown, Cynthia Cheung, Mike Desch, Noah Desch, John Dorband, Ken Lee, Alan Lunsford, Nicholas Shur, Rick Wesenberg, Michael L. Rilee, Pamela Clark and Richard Watson</i>	
The Mars Exploration Rover Surface Mobility Flight Software: Driving Ambition	51
<i>Jeffrey J. Biesiadecki and Mark W. Maimone</i>	
A Comparison of Force Sensing Techniques for Planetary Manipulation	66
<i>Daniel Helmick, Avi Okon, and Matt DiCicco</i>	
Concept for Coring from a Low-mass Rover	80
<i>Paul Backes, Oussama Khatib, Antonio Diaz-Calderon, James Warren, Curtis Collins and Zensheu Chang</i>	
Vision-Based End-Effector Position Error Compensation	90
<i>Max Bajracharya, Matthew DiCicco and Paul Backes</i>	
Global Precipitation Measurement Mission Architecture and Mission Concept	97
<i>David Bundas</i>	
Herschel/Planck Program Spacecraft Design Solutions for two Science Missions	104
<i>Astrid Heske, Thomas Passvogel, Gerald Crone, Jean-Jacques Juillet, Bernard Collaudin and Pascal Rideau</i>	
An Architecture Program for the Robotic Exploration of Venus	115
<i>Juan Martín Canales-Romero, Adnan Shear Khan and Jonas Jonsson</i>	
Exploring the Possibilities: Earth and Space Science Missions in the Context of Exploration	124
<i>Barbara Pfarr, Michael Calabrese, James Kirkpatrick and Jonathan T. Malay</i>	
Navigator Program: Exploring New Worlds	131
<i>Peter R. Lawson</i>	
Design of a Long Endurance Titan VTOL Vehicle	141
<i>Ravi Prakash, Robert D. Braun, Luke S. Colby, Scott R. Francis, Mustafa E. Gündüz, Kevin W. Flaherty, Jarret M. Lafleur and Henry S. Wright</i>	

Table of Contents

GeoSTAR: Developing A New Payload for GOES Satellites	157
<i>Bjorn Lambrigtsen</i>	
Architecting Space Exploration Campaigns: A Decision Analytic Approach.....	167
<i>Erin Baker, Elisabeth L. Morse, Andrew Gray and Robert Easter</i>	
Human Spaceflights Will Extend Regulatory and Legal Framework Governing Civil Aviation.....	186
<i>Mariagrazia Spada</i>	
What Titan is Really Like: In-Situ Measurements of the Titan Environment by the Huygens Probe	196
<i>Ralph Lorenz</i>	
Mars Ascent Vehicle Key Elements of a Mars Sample Return Mission	206
<i>David D. Stephenson and Harvey J. Willenberg</i>	
Construction and Resource Utilization eXplorer (CRUX).....	217
<i>Albert F. C. Haldemann, Jerome B. Johnson, Richard C. Elphic, William V. Boynton and John Wetzel</i>	
Planning for Planetary Protection and Contamination Control: Challenges Beyond Mars.....	227
<i>Andrea P. Belz and James A. Cutts</i>	
Design Tools for Cost-Effective Implementation of Planetary Protection Requirements.....	234
<i>Louise Hamlin, Andrea Belz, Michael Evans, Jason Kastner, Celeste Satter and Andy Spry</i>	
Cleaning to Achieve Sterility.....	241
<i>Roger Kern, Larry Kirschner, Myron La Duc, Fei Chen and Kasthuri Venkateswaran</i>	
A Rapid Micro-Detection System for the Enumeration of Bacterial Endospores.....	249
<i>Fei Chen, Gayane A. Kazarians, Kasthuri Venkateswaran and Roger Kern</i>	
Electron Beam (10 MeV) Irradiation to Decontaminate Spacecraft Components for Planetary Protection	258
<i>Suresh D. Pillai, Kasthuri Venkateswaran, Martha Cepeda, Kamlesh Soni, Sarah Mittasch, Joe Maxim, and Shariff Osman</i>	
Preventing the Forward Contamination of Mars	267
<i>John D. Rummel</i>	
The Glory Program: Global Science from a Unique Spacecraft Integration	273
<i>Jaya Bajpayee, Darcie Durham and Thomas Itchkawich</i>	
James Webb Space Telescope Project Overview	283
<i>Phillip A. Sabelhaus and John Decker</i>	
Return to Mercury: The MESSENGER Spacecraft and Mission	296
<i>Robin M. Vaughan, James C. Leary, Richard F. Conde, George Dakermanji, Carl J. Ercol, Karl B. Fielhauer, David G. Grant, Theodore J. Hartka, T. Adrian Hill, Steven E. Jaskulek, James V. McAdams, M. Annette Mirantes, David F. Persons, and Dipak K. Srin</i>	
The U.S. Rosetta Project: Eighteen Months in Flight.....	312
<i>C. Alexander, S. Gulkis, M. Frerking, D. Holmes, P. Weissman, J. Burch, A. Stern, R. Goldstein, J. Parker, T. Cravens, S. Fuselier, T. Gombosi, P. Ferri and E. Montagnon</i>	
Phoenix - The First Mars Scout Mission (A Mid-Term Report)	327
<i>Barry Goldstein and Robert Shotwell</i>	
Demonstration and Science Experiments for DoD Space Capability in the MEO.....	345
<i>Greg Spanjers, James Winter, Dan Cohen, Aaron Adler, Jason Guarnieri, Martin Tolliver, Greg Ginet, Broniek Dichter and Jeff Summers</i>	
Surface and Borehole Neutron Probes for the Construction and Resource Utilization eXplorer	355
<i>Richard C. Elphic, Sangkoo Hahn, David J. Lawrence, William C. Feldman, Jerome B. Johnson and Albert F. C. Haldemann</i>	
Electrical Properties Cup (EPC) for Characterizing Water Content of Martian and Lunar Soils.....	363
<i>M. G. Buehler, H. Bostic, K. B. Chin, T. McCann, D. Keymeulen, R. C. Anderson, S. Seshadri, and M. G. Schaap</i>	
A Seismic Profiler for the Construction and Resource Utilization Explorer.....	381
<i>Donald G. Albert and W. Bruce Banerdt</i>	

Table of Contents

Miniature Ground Penetrating Radar, CRUX GPR.....	387
<i>Soon Sam Kim, Steven R. Carnes, Albert F. Haldemann, Eddie Ho Wah Ng and Steven A. Arcone</i>	
Atmospheric Electron-Induced X-ray Spectrometer Development	394
<i>Jaroslava Z. Wilcox, Eduardo Urgiles, Risaku Toda, and Joy Crisp</i>	
Deployable Wood Wasp Drill for Planetary Subsurface Sampling.....	405
<i>Yang Gao and Alex Ellery</i>	
Pulsed Cavity Ringdown Laser Absorption Spectroscopy in a Hollow Waveguide.....	412
<i>Greg S. Mungas and Christopher Dreyer</i>	
Forecasting of Solar Particle Event Integral Proton Fluences Using Bayesian Inference.....	425
<i>John S. Neal and Lawrence W. Townsend</i>	
Characterization of the Lunar Radiation Environment Using the CRA TER Detector	434
<i>Lawrence W. Townsend, Hanna M. Moussa, and Youssef Charara</i>	
Electrostatic Active Radiation Shielding Revisited.....	444
<i>Ram K. Tripathi, John W. Wilson and Robert C. Youngquist</i>	
Effectiveness of Shielding Materials for Dose Reduction	453
<i>S. B. Guetersloh, C. Zeitlin, L. H. Heilbronn and J. Miller</i>	
Boron Based Advanced Materials for Radiation Protection.....	458
<i>W. Kowbel, C. Bruce and J. C. Withers</i>	
FLUKA Status and Preliminary Results from the July-2005 AGS Run.....	465
<i>Lawrence S. Pinsky, Victor Andersen, Najib Elkhayari, Anton Empl, Matthew Lebourgeois, Kerry Lee, Billy Mayes, Georgi Smirnov, Neal Zapp, Alfredo Ferrari, Stefan Roesler, Vasilis Vlachoudis, Giuseppe Battistoni, Mauro Campanella, Francesco Cerutti, Ettore Gadioli, Maria-Vittoria Garzelli, Silvia Muraro, Tiziana Rancati and Paola Sala, Francesca Ballarini, Andrea Ottolenghi, Domenico Scannicchio, Massimo Carboni and Maurizio Pelliccioni, Thomas Wilson, Johannes Ranft and Alberto Fasso'</i>	
Technology Validation: NMP ST8 Dependable Multiprocessor Project	472
<i>John R. Samson, Jeremy Ramos, Minesh Patel, Alan D. George and Raphael Some</i>	
Formulation Refinement and Access to Space for the ST8 Mission.....	486
<i>Philip R. Turner and Linda M. Herrell</i>	
Access to Space for Technology Validation Missions: Exploring Possibilities of Suborbital Flight.....	492
<i>L. Herrell and X. Zhou</i>	
Space Technology 8 - Mission	501
<i>Stephen Franklin, Jentung Ku, Brian Spence, Mike McEachen, Steve White, John Samson, Rafael Some and Jennifer Zsoldos</i>	
Space Technology 5 - Technology Validation Update	517
<i>Candace C. Carlisle, Guan Le, James A. Slavin, J. Timothy VanSant and Evan H. Webb</i>	
Autonomous Science Agents and Sensor Webs: EO-1 and Beyond	527
<i>Rob Sherwood, Steve Chien, Daniel Tran, Benjamin Cichy, Rebecca Castano, Ashley Davies and Gregg Rabideau</i>	
Space Technology 7 Disturbance Reduction System - Precision Control Flight Validation	537
<i>A. Carmain, C. Dunn, W. Folkner, V. Hruby, D. Spence, N. Demmons, T. Roy, R. McCormick, C. Gasdaska, J. Young, W. Connolly, J. O'Donnell, F. Markley, P. Maghami and O. Hsu</i>	
Relative Motion Model Including J2: Derivation and Application to INSAR.....	544
<i>Giancarmine Fasano and Marco D'Errico</i>	
Orbit Design and Optimization Based on Global Telecommunication Performance Metrics.....	556
<i>Seungwon Lee, Charles H. Lee, Stuart Kerridge, Charles D. Edwards, and Kar-Ming Cheung</i>	
New Developments in the WAVE W-Band Mission	567
<i>A. Jebiril, M. Lucente, T. Rossi, M. Ruggieri, V. Dainelli and L. Zuliani</i>	
Control Effort Evaluation for Low-Altitude Formation Flying	576
<i>Marco Sabatini - Giovanni Palmerini</i>	

Table of Contents

Modelling of Periodic Relative Orbits Using Orbital Element Method	584
<i>Shankar Kumar Balaji and Adrian Tatnall</i>	
Early Experiments with W-band Satellite Links	590
<i>Giorgio Perrotta, Ahmed Jebril and Marina Ruggieri</i>	
Innovative Technologies for the Developments of W-band Radars and Communication Payloads	601
<i>V. Dainelli, E. Limiti and M. Ruggieri</i>	
Mars Technology Program Communications and Tracking Technologies for Mars Exploration	608
<i>Dimitrios Antsos</i>	
A UHF Proximity Micro-Transceiver for Mars Exploration.....	628
<i>William Kuhn, Norman Lay and Edwin Grigorian</i>	
Physical Layer Effects on MAC Layer Performance of IEEE 802.11 a and b WLAN on the Martian Surface	635
<i>Anirudh Daga, Deva K. Borah, Gaylon R. Lovelace and Phillip De Leon</i>	
Advances in Rover Technology for Space Exploration	643
<i>Paul S. Schenker</i>	
Object Modeling and Matching from Multi-view Ground Images for Automated Mars Rover Localization	666
<i>Ron Li, Kaichang Di, Sanchit Agarwal and Jue Wang</i>	
Technologies for Exploring the Martian Subsurface.....	674
<i>Suparna Mukherjee, Paul Bartlett, Brian Glass, Jose Guerrero and Scott Stanley</i>	
Development of Advanced Entry, Descent, and Landing Technologies for Future Mars Missions	685
<i>Cheng-Chih (Chester) Chu</i>	
Low Temperature Thermal Cycle Survivability and Reliability Study for Brushless Motor Drive Electronics	693
<i>Carissa D. Tudryn, Benjamin Blalock, Gary Burke, Yuan Chen, Scott Cozy, Reza Ghaffarian, Don Hunter, Michael Johnson, Elizabeth Kolawa, Mohammad Mojarradi, Don Schatzel and Andrew Shapiro</i>	
Mars Miniature Science Instruments.....	730
<i>Soon Sam Kim, Samad Hayati, David Lavery and Karen S. McBride</i>	
Mars Technology Program Planetary Protection Technology Development	741
<i>Ying Lin</i>	
A Rapid Single Spore Enumeration Assay	751
<i>Pun To Yung, Michael J. Kempf and Adrian Ponce</i>	
Telecommunications IT and Navigation for Future Mars Exploration Missions	764
<i>E. Jay Wyatta, Todd A. Elya, Matthew A. Klimesha, Christopher J. Krupiarzb</i>	
Mars Exploration Entry, Descent and Landing Challenges	776
<i>Robert D. Braun and Robert M. Manning</i>	
Status of Aerothermal Modeling for Current and Future Mars Exploration Missions	794
<i>Michael J. Wright, Karl T. Edquist, Brian R. Hollis, Joseph Olejniczak and Ethiraj Venkatapathy</i>	
Mars Deployable Decelerators Capability Roadmap Summary.....	810
<i>Allen Witkowski and Glen Brown</i>	
Performance Trades for Mars Pinpoint Landing	817
<i>Aron A. Wolf, Jeff Tooley, Scott Ploen, Mark Ivanov, Behcet Acikmese, Konstantin Gromov</i>	
Passive Imaging Based Multi-cue Hazard Detection for Spacecraft Safe Landing	833
<i>A. Huertas, Y. Cheng, R. Madison</i>	
A Novel Tiered Sensor Fusion Approach for Terrain Characterization and Safe Landing Assessment.....	847
<i>Navid Serrano, Max Bajracharya, Ayanna Howard, Homayoun Seraji</i>	
Mars Science Laboratory Entry, Descent, and Landing System.....	857
<i>Adam Steltzner, Devin Kipp, Allen Chen, Dan Burkhart, Carl Guernsey, Gavin Mendeck, Robert Mitcheltree, Richard Powell, Tommaso Rivellini, Miguel San Martin, David Way</i>	

Table of Contents

Mars Science Laboratory Launch-Arrival Space Study: A Pork Chop Plot Analysis	872
<i>Alicia Dwyer Cianciolo, Richard Powell, Mary Kae Lockwood</i>	
Asymptotic Parachute Performance Sensitivity.....	882
<i>David W. Way, Richard W. Powell, Allen Chen, Adam D. Steltzner</i>	
Mars Science Laboratory Entry Descent and Landing System Verification and Validation Program	891
<i>Robert Mitcheltree, Adam Steltzner, Allen Chen, Miguel SanMartin, Tomasso Rivellini</i>	
A Low Cost, High Performance Reconfigurable Computing Based Unmanned Aerial Vehicle	897
<i>Grant Wigley, Mark Jasiunas</i>	
Active Airborne Localisation and Exploration in Unknown Environments using Inertial SLAM.....	910
<i>Mitch Bryson and Salah Sukkarieh</i>	
A Robust Compositional Architecture for Autonomous Systems.....	923
<i>Guillaume Brat, Ewen Denney, Kimberley Farrell, Dimitra Giannakopoulou, Ari Jónsson, Jeremy Frank, Mark Boddy, Todd Carpenter, Tara Estlin, Mihail Pivtoraiko</i>	
A Lightweight Formation Control Methodology for a Swarm of Non-Holonomic Vehicles.....	931
<i>Gabriel H. Elkaim and Robert J. Kelbley</i>	
Robust Coordination for Large Sets of Simple Rovers	939
<i>Kagan Tumer and Adrian Agogino</i>	
Low-Voltage Ferroelectric Phase Shifters from L- to C-Band and their Applications	950
<i>J. Stevenson Kenney, Yong Kyu Yoon, Minsik Ahn, Mark G. Allen, Zhiyong Zhao, Xiaoyan Wang, Andrew Hunt, Dongsu Kim</i>	
Semiconductor Substrates in Phased Arrays - Integration Issues, Challenges and Laboratory Results.....	959
<i>Janice C. Rock</i>	
Electromagnetic Study of Multilayer Media	972
<i>Joel P. Booth and Stephanie Brown</i>	
The UAVSAR Phased Array Aperture.....	978
<i>Neil Chamberlain, Mark Neil Chamberlain, Mark Zawadzki, Greg Sadowy, Eric Oakes, Kyle Brown, Richard Hodges</i>	
Thermal Considerations for Hydroformed Reflectors.....	991
<i>William A. Imbriale, Eric Gama, Kenneth S. Smith, Roger Shultz</i>	
Lower-Cost Architectures for Large Arrays of Small Antennas.....	1005
<i>Dayton L. Jones</i>	
Mathematical Gain Models of Large-aperture Earth Station Antennas for Space Research Service	1014
<i>Vahraz Jamnejad and Ted Peng</i>	
Combined UHF/X-Band Proximity Link Antenna for Future Mars Telecommunications Orbiters.....	1026
<i>Raymond L. Lovestead and Anthony J. Jensen</i>	
An S Band Antenna System Used for Communication on Earth Observation Microsatellite.....	1033
<i>Lahcene Hadj Abderrahmane, M. Benyettou,</i>	
Initial results of the GeoSTAR Prototype (Geosynchronous Synthetic Thinned Array Radiometer)	1039
<i>A. B. Tanner, S. T. Brown, S. J. Dinardo, T. M. Gaier, P. P. Kangaslahti, B. H. Lambrigtsen, W. J. Wilson</i>	
High Power Electronic Scanning Millimeter-Wave Radar System Design	1048
<i>Stephen M. Sekelsky, James Carswell</i>	
ImagingWind and Rain Airborne Profiler for Remote Sensing of the Ocean and the Atmospheric Boundary Layer.....	1054
<i>Daniel Esteban Fernandez, Paul S. Chang, James R. Carwell, Robert F. Contreras, Stephan J. Frasier</i>	
A Highly Capable Arbitrary Waveform Generator for Next Generation Radar Systems.....	1061
<i>Ernie Chuang, Scott Hensley, and Kevin Wheeler</i>	
Numerical Analysis of Large Reflector System used as a Ground Station Antenna	1068
<i>Nader Farahat, Raj Mittra and Jesus Sanchez</i>	

Table of Contents

Sum and Difference Beam-Pattern Synthesis with Side-Lobe Control	1083
<i>Nivia Colón-Díaz, Thomas E. Morton, Krishna M. Pasala</i>	
Rotman Lens Development at the Army Research Lab	1093
<i>Steven Weiss and Robert Dahlstrom</i>	
Antenna Design and Beamforming for a Conformal Antenna Array Demonstrator	1100
<i>P. Knott</i>	
Initial Demonstration of an X-Band Digital Beamforming (DBF) Receive Array	1107
<i>Daniel N. Spendley, Joseph D. Rosal, David D. Curtis, William H. Weedon and John Burroughs</i>	
Analysis of Signal to Noise Ratio in Photonic Beamformers	1117
<i>N. M. Froberg, E. I. Ackerman and C. H. Cox</i>	
Robust Tracking Control of Attitude Satellite Using New SMC and EKF for Large Maneuvers	1129
<i>Mehrdad Jafarboland, Nasser Sadati and Hamidreza Momeni</i>	
Disturbance and Parameter Estimation Algorithms for Attitude Control Model of the Satellite Maneuvers	1139
<i>Mehrdad Jafarboland and Hamidreza Momeni</i>	
Nonlinear Oscillator Array Antenna Development at GTRI	1145
<i>Ted Heath, Robert R. Kerr, Glenn D. Hopkins</i>	
Coupled Oscillator Based Agile Beam Transmitters and Receivers: A Review of Work at JPL	1164
<i>Ronald J. Pogorzelski</i>	
Adaptive Interference Mitigation with a Coupled Nonlinear Oscillator Array Beamformer	1178
<i>Takeshi Ikuma, A. A. (Louis) Beex, James R. Zeidler, Brian K. Meadows</i>	
Improved Mutual Injection Locking Range for VCOs in a Coupled Oscillator System	1191
<i>Chris Tompkins, Venkatesh Seetharam, L. Wilson Pearson</i>	
Constella: Quick Configuration Platform for Rapid Response Missions	1203
<i>Maarten (Max) Meerman, Martin Sweeting</i>	
Preliminary On-orbit Maneuver Analysis for Responsive Space Applications	1210
<i>Edward Jones and Alisa Hawkins</i>	
RF Technologies for Advancing Space Communication Infrastructure	1224
<i>Irene Bibyk, Robert Romanofsky, Ed Wintucky</i>	
Applications and Operation Concepts of Large Transmit Phased Array of Parabolic Reflectors	1233
<i>Farid Amoozegar</i>	
Exo-Atmospheric Telescopes for Deep Space Optical Communications	1253
<i>William J. Hurd, Rud V. Moe, Michael L. Dennis, Edward S. Cheng, K. J. Kasunic, Bente Debora, A. Fairbrother</i>	
End-to-End Information System Concept for the Mars Telecommunications Orbiter	1265
<i>Julian C. Breidenthal, Charles D. Edwards, Edward Greenberg, Greg J. Kazz, Gary K. Noreen</i>	
Ka-Band Link Optimization with Rate Adaptation	1278
<i>Jun Sun, Jay Gao, Shervin Shambayati and Eytan Modiano</i>	
An Advanced Orbiting Systems Approach to Quality of Service in Space-Based Intelligent Communication Networks	1285
<i>Andrew P. Riha, Clayton Okino</i>	
A Non-Broadcast Address Resolution Protocol for SpaceWire Networks	1296
<i>Sandra G. Dykes, Buddy Walls, Mark A. Johnson, Kristian Persson</i>	
The NASA Space Communications Testbed (SCT)	1305
<i>Jack Rieser, Kirk Berry, Loren Clare and Richard Slywczak</i>	
Adaptation, Modeling, and Analysis of PIM DM in a LEO Satellite Network Environment	1316
<i>Victor P. Hubenko, Jr., Richard A. Raines, Michael A. Temple, Robert F. Mills, Mark D. Saeger</i>	

Table of Contents

Energy Efficient Transmission Scheduling over Mars Proximity Links	1324
<i>Alessandro Tarello, Jay Gao and Eytan Modiano</i>	
A Split Implementation of the Dynamic Source Routing Protocol for Lunar/Planetary Surface Communications	1334
<i>Jerry Toung, Raymond Gilstrap, Kenneth Freeman</i>	
A Link-State Routing Approach for Formation Flying Spacecraft.....	1342
<i>Pitiporn Pakdeepinit, Tapanan Yeophantong, Thanachai Thumthawatworn and Pratit Santiprabhob</i>	
Global Assessor: Transformational Tools for Transformational Missions	1355
<i>Dan Walkovitz</i>	
TSAT Advanced Network Services and Routing Architecture	1366
<i>Ferit Yegenoglu, Dan Voce, and Dilip Gokhale</i>	
QoS Architecture for Session Oriented GIG Applications.....	1372
<i>Anshul Kantawala, Dan Voce, Dilip Gokhale</i>	
Evolvable Navigation and Communication Infrastructure for Lunar Exploration	1381
<i>P. A. Stadter, P. J. Sharer, J. J. Guzman, C. S. Engelbrecht, D. A. Eng., E. J. Finnegan, D. B. Bussey, P. D. Spudis</i>	
Application of Adaptive Optics to a Moon-to-Earth Optical Data Link.....	1388
<i>Gregory Konesky</i>	
Near-Sun Free-Space Optical Communications from Space	1395
<i>A. Biswas, F. Khatri, D. Boroson</i>	
The Effect of Synchronization Errors on the Performance of Telescope Arrays for Optical Deep Space Communications	1404
<i>Ali Asghar Eftekhari, Ali Javad Hashmi, Ali Adibi, Farid Amoozegar</i>	
Flexible Coherent Digital Transceiver for Low Power Space Missions	1411
<i>Christopher B. Haskins, Wesley P. Millard, J. Robert Jensen</i>	
A X/X Spread-Spectrum Transponder for Secure Communication	1419
<i>L. Simone, F. De Tiberis, F. Barletta, D. Gelfusa, S. Cocchi, F. Argentieri, R. Viola, I. Martinazzo, M. Delfino, P. Panella, F. Felici, R. Novello, M. C. Comparini</i>	
The Koreasat 5 Secure Communication System: Design, Development & Performance.....	1430
<i>R. Novello, L. Simone, F. De Tiberis, M. Parisse, S. Paolucci, F. Barletta, D. Gelfusa, S. Cocchi, D. Fiore, R. Viola, I. Martinazzo, G. Lippolis, A. Bernardi, F. Autelitano, N. Salerno, M. Delfino, P. Panella, F. Felici</i>	
Link Analysis for BILSAT-1.....	1442
<i>Ali Telli and Alphan Es</i>	
Dynamic Proximity Communication Link Analysis Tool for Orbiting Satellites and Ground Assets on Mars.....	1448
<i>Yogi Y. Krikorian, Milton K. Sue, Giadira V. Leon, Lamont Cooper, Sieu K. Do, Rajendra Kumar, David Taggart, Debra L. Emmons, Donald J. Dichmann, John P. McVey, and Eric T. Campbell</i>	
Weather Related Continuity and Completeness on Deep Space Ka-band Links: Statistics and Forecasting	1456
<i>Shervin Shambayati</i>	
Telemetry Recovery and Uplink Commanding of a Spacecraft Prior to Three-Axis Attitude Stabilization.....	1464
<i>Jonathan R. Bruzzi, J. Robert Jensen, Karl B. Fielhauer, Darryl W. Royster, Dipak K. Srinivasan</i>	
Use of Trellis-Coded Modulation for Gigabit/sec Transmissions over W-Band Satellite Links.....	1475
<i>Claudio Sacchi, Anelia Grigorova</i>	
On a Method to Establish Satellite Links for Dynamic Bandwidth Allocation.....	1488
<i>V. Weerackody, E. Cuevas and L. Gonzalez</i>	
Assessing the Performance of Packet Retransmission Schemes Over Satellite Links	1496
<i>James Hant, Donald Lanzinger, and Dean Sklar</i>	
Improved Antenna-Array Multi-User OFDM in Slow-Fading Frequency-Selective Channels.....	1509
<i>Thomas Ketsoglou</i>	

Table of Contents

Modeling and Simulation of Amplifier Nonlinearities for Single 8-PSK Modulated Signal Input	1516
<i>D. Taggart, R. Kumar, Srini Raghavan, Gary Goo, Nick Wagner Joseph Chen, and Yogi Krikorian</i>	
Simulation Study of Wideband Interference Rejection using STAP.....	1532
<i>Walter Au, Lijia Chen, Kenny Loo, Aldous Pabon, Yao Xiao</i>	
Probability Mass Functions for de Bruijn Weight Classes	1539
<i>Gregory L. Mayhew</i>	
Mitigation of Multipath Effects in OFDM Systems using Quantized State Adaptive Equalizers	1551
<i>Rajendra Kumar and Mubeen Khan</i>	
Effect of Nonlinear Amplification on Turbo Coding Gain.....	1560
<i>Eugene Grayver and P. E. Santacruz</i>	
Efficient Modeling and Simulation of Nonlinear Amplifiers	1568
<i>V. S. Lin, A. Arredondo, and J. Hsu</i>	
Power Control Algorithm and Architectures for Fading Communication Channels.....	1577
<i>Rajendra Kumar</i>	
Analysis of FM Demodulator Output Noise with Applications to the Space Lift Range System.....	1589
<i>Rajendra Kumar</i>	
A Parameterized Model for Efficient Over-Sampled Filter A Parameterized Model for Efficient Over-Sampled Filter.....	1598
<i>Waleed Namoos</i>	
Characterizing the Impact of Precision Time and Range Measurements on Network Position Solutions	1609
<i>Kendra L. B. Cook, John F. Raquet, Richard Beckman</i>	
Spread Spectrum Codes for GPS L5.....	1617
<i>Srini H. Raghavan, Mark Shane, and Robert Yowell</i>	
Adaptive Two-Channel Automatic Gain Control System	1624
<i>Alexander Utter, Henry Chen, Shane Ouchi, David Money Harris, Amanda Rainer, Keane Kaneakua, and Chris Prounh, Samuel S. Osofsky</i>	
Influence of Weight Function Nonorthogonality on Sampling with Internal Filtering	1632
<i>G. Poberezhskiy and Y. Poberezhskiy</i>	
NASA Study for Establishing Baseline Requirements for Future Terminal Airspace CNS Systems	1647
<i>Chris A. Wargo, Rafael Apaza</i>	
Traffic Management Automation for Non-Towered Airports.....	1655
<i>John Sorensen, Mark Peters, and David Schleicher</i>	
Efficient Algorithm for Optimal Scheduling of Aircraft Arrivals at Congested Airports	1670
<i>Aditya P. Saraf, Gary L. Slater</i>	
European A-SMGCS: the Challenge of Milan-Malpensa Airport in the Context of EMMA Project.....	1681
<i>Daniele Teotino, Antonio Nuzzo, Marina Ruggieri</i>	
Emerging Definition of Next-Generation of Aeronautical Communications	1690
<i>Robert J Kerczewski</i>	
Concept for an Integrated National Surveillance and Data Communication Infrastructure	1697
<i>Todd Donovan</i>	
A Network-Centric Approach to Enhanced National Airspace Security	1711
<i>Robert J. Stamm, Yolanda McCleese and Anthony J. Jagodnik</i>	
Fundamental Issues in Systematic Design of Airborne Networks for Aviation	1721
<i>Yang Wang and Yiyuan J. Zhao</i>	

Table of Contents

Air to Air Communication Protocol.....	1729
<i>Arjan Durresti, Vamsi Paruchuri, Leonard Barolli and Raj Jain</i>	
Modular, Cost-Effective, Extensible Avionics Architecture for Secure, Mobile Communications	1737
<i>William D. Ivancic</i>	
A Real-Time Communication Framework for Wireless Sensor-Actuator Networks	1746
<i>Edith C. H. Ngai, Michael R. Lyu, Jiangchuan Liu</i>	
Enhanced ADS-B Research.....	1755
<i>Ken Samuelson, Ed Valovage, Dana Hall</i>	
Techniques for Ensuring Co-existence Between B-VHF and Legacy VHF Systems	1762
<i>Sinja Brandes, Ivan Cosovic, Michael Schnell</i>	
Evaluating Alternative Architectures for Lightweight Space Telescopes using Parameterized Models	1771
<i>Scott A. Uebelhart, Deborah Howell and David W. Miller</i>	
Clear Aperture Design Criterion for Deformable Membrane Mirror Control	1783
<i>Michael J. Shepherd, Richard G. Cobb, William P. Baker</i>	
Space Power Facility for Testing Large Space Optical Systems.....	1798
<i>Jerry Carek</i>	
Architectures for Space Astronomical Telescopes Using Fresnel Optics.....	1807
<i>Jonanthan Arenberg and Amy Lo</i>	
Fabrication and Characterization of Large-Area 3-D Photonic Crystals.....	1820
<i>F. B. McCormick, J. G. Fleming, S. Mani, M. R. Tuck, J. D. Williams, C. L. Arrington, S. H. Kravitz, C. Schmidt, G. Subramania, J. C. Verley, A. R. Ellis, I. El-kady, D. W. Peters, M. Watts, W. C. Sweatt, J. J. Hudgens</i>	
Investigation of Millimeter Wave Parametric Generation from a THz Photonic Band Gap Device	1828
<i>Yuchuan Chen, Mark Cronin-Golomb, Lei Zhang, Jing Zhao and James J. Foshee</i>	
High-Resolution Liquid Crystal Spatial Light Modulators for Adaptive Optics.....	1836
<i>Jason D. Schmidt, Matthew R. Whiteley, Matthew E. Goda, Bradley D. Duncan</i>	
Vertical Cavity Surface Emitting Lasers for Spaceflight Multi-Processors	1846
<i>Laurence E. LaForge, Jeffrey R. Moreland, Raymond G. Bryan, M. Sami Fadali</i>	
Beam Steering in Photonic Crystal Vertical Cavity Semiconductor Laser Arrays	1865
<i>Kent D. Choquette, James J. Raftery, Jr., and Ann C. Lehman</i>	
Feasibility Analysis of a HAP-LEO Optical Link for Data Relay Purposes.....	1872
<i>Mirko Antonini, Silvello Betti, Valeria Carrozzo, Elisa Duca, Marina Ruggieri</i>	
Spacecraft Hazard Avoidance Utilizing Structured Light.....	1879
<i>Carl Christian Liebe, Curtis Padgett, Jacob Chapsky, Daniel Wilson, Kenneth Brown, Sergei Jerebets, Hannah Goldberg, Jeffrey Schroeder</i>	
Impacts of Upper Tropospheric Clouds on GPS Radio Refractivity	1889
<i>Grace S. Peng, Manuel de la Torre-Juárez, Robert W. Farley, John E. Wessel</i>	
The High Output Maximum Efficiency Resonator Developed for Long Life, Space-Based Altimetry.....	1895
<i>Barry Coyle and Paul R. Stysley</i>	
Multi-Spectral Foveated Imaging System.....	1902
<i>Brett E. Bagwell, David V. Wick, Jim Schwiegerling</i>	
Measuring a Deformable Mirrors Surface While Under Physical Vibrations.....	1909
<i>Christopher C. Wilcox, Jonathan R. Andrews, Sergio R. Restaino, Ty Martinez, Freddie Santiago, Erick Roura, Scott W. Teare and Don M. Payne</i>	
Diamond Milling of Micro-Optics	1916
<i>WC Sweatt, DD Gill, DP Adams MJ Vasile, and AA Claudet</i>	
Resolution Enhanced Sparse Aperture Imaging.....	1922
<i>Nick Miller, Bradley Duncan and Matthew P. Dierking</i>	

Table of Contents

Strategies for Hyperspectral Target Detection in Complex Background Environments	1938
<i>Michael Eismann</i>	
Weighted Frame Averaging for Motion Compensation of Laser Radar Image Data	1948
<i>Adam MacDonald</i>	
The Application of Inverse Filters to 3D Microscanning of LADAR Imagery	1957
<i>Ernest Armstrong and Richard Richmond</i>	
Joint Blind Deconvolution and Image Correlography via a Bayesian Image Reconstruction Algorithm	1963
<i>Stephen C. Cain</i>	
Responsivity and Lifetime of Resonant Cavity Enhanced HgCdTe Detectors	1969
<i>Justin G. A. Wehner, Charles A. Musca, Richard H. Sewell, J. M. Dell, and L. Faraone</i>	
Advanced Sun-Sensor Processing and Design for Super-Resolution Performance	1978
<i>John Enright & Godard</i>	
An Analog Optical Computational Approach to RF Image Formation	1992
<i>Robert J. Bonneau</i>	
Electro-Optical Signatures Comparisons of Geosynchronous Satellites	1998
<i>Tamara E. Payne, Stephen A. Gregory, Kim Luu</i>	
Simulations Studies of Multisensor Track Association and Fusion Methods	2004
<i>Lance M. Kaplan, William Dale Blair, and Yaakov Bar-Shalom</i>	
Sensor Resource Management Using Cost Functions	2020
<i>John E. Gray and A. Sunshine Smith-Carroll</i>	
ML-PDA Track Validation Thresholds	2027
<i>Wayne R. Blanding, Peter K. Willett, Yaakov Bar-Shalom</i>	
Vision-Based Relative Pose Estimation for Autonomous Rendezvous and Docking	2038
<i>Jed M. Kelsey, Jeffrey Byrne, Martin Cosgrove, Sanjeev Seereeram, Raman K. Mehra</i>	
Radar Measurement Noise Variance Estimation with Targets of Opportunity	2058
<i>Richard W. Osborne III, Yaakov Bar-Shalom</i>	
Optimal Image Processing for Multi-Target Tracking of Dismounted Targets in an Urban Environment	2064
<i>Jon P. Champion and Juan R. Vasquez</i>	
Comparison of Soft and Hard Assignment ML Trackers on Multistatic Data	2073
<i>Peter Willett, Stefano Coraluppi and Wayne Blanding</i>	
Advances in the PMHT as a Network-level Composite Tracker	2085
<i>Darin Dunham</i>	
Comparison of EKF- and PF-based Methods in Tracking Maneuvering Targets	2093
<i>Monica F. Bugallo, Shanshan Xu, and Petar M. Djuric</i>	
The Marginalized Particle Filter in Practice	2099
<i>Thomas B. Schon, Rickard Karlsson and Fredrik Gustafsson</i>	
Online Multisensor-Multitarget Detection and Tracking	2110
<i>William Ng, Jack Li, and Simon Godsill</i>	
Multi Target Direction-of-Arrival Tracking using Road Priors	2126
<i>Volkan Cevher, Rajbabu Velmurugan, and James H. McClellan</i>	
Meshfree Adjoint Methods for Nonlinear Filtering	2135
<i>Fred Daum and Mikhail Krichman</i>	
Multiple Object Tracking Using Particle Filters	2151
<i>M. Jaward, L. Mihaylova, N. Canagarajah and D. Bull</i>	
Extended Area Protection System (EAPS) Program Overview	2159
<i>Brian J. Smith Roswell, W. Nourse, James L. Baumann, George Sanders</i>	

Table of Contents

Intelligent Identification Software Module (IISM) for the US Navys Combat Centers	2167
<i>Robert Richards, Richard Stottler, Ben Ball, and Coskun Tasoluk</i>	
A Remedy for Nonstationarity in Background Transition Regions for Real Time Hyperspectral Detection	2177
<i>A Schaum</i>	
A Statistical Approach to Quantifying Clutter in Hyperspectral Infrared Images	2186
<i>Oladipo O. Fadiran, Peter Molnar, Lance M. Kaplan</i>	
Analytical Results in Detecting Broadband Signals in Reverberant Dispersive Environments	2196
<i>Robert Lynch, Ivars Kirsteins, James Kelly, Peter Willett</i>	
Transmit Waveform Diversity for Space Based Radar	2205
<i>Peter A. Zulch, Robert H. Hancock, William Moran, Sofia Suvorova, James Byrnes</i>	
SBR Waveform and Processing Parameters as a Function of Array Distortion.....	2215
<i>Richard Schneible, Yuhong Zhang, Abdelhak Hajjari, Richard S. Pierro, Scott E. Parker</i>	
Achieving Sub-Pixel Registration Accuracy for Radar Imagery.....	2230
<i>Hanna E. Witzgall, Peter S. Gural, and Edward C. Mahen</i>	
An Application of Advanced Spectrum Estimation to Multi-Channel Radar Detection and Location	2237
<i>William C. Ogle, Howard Mendelson and Peter A. Zulch</i>	
A Rate Distortion Method for Waveform Design in RF Target Detection	2244
<i>Robert J. Bonneau</i>	
Progress in Four-beam Nulling: Results from the Terrestrial Planet Finder Planet Detection Testbed	2256
<i>Stefan Martin</i>	
Testing the TPF Interferometry Approach Before Launch	2264
<i>E. Serabyn and B. Mennesson</i>	
Development and Validation of High Precision Models for SIM Planetquest.....	2273
<i>Chris A. Lindensmith, H. Clark Briggs, Yuri Beregovski, V. Alfonso Fera, Renaud Goullioud, Yekta Gursel, Inseob Hahn, Gary Kinsella, Matthew Orzewalla, Charles Phillips</i>	
Results from the TOM3 Testbed: Thermal Deformation of Optics at the Picometer Level.	2289
<i>R. Goullioud, C. A. Lindensmith, I. Hahn</i>	
Engineering the LISA Project: Systems Engineering Challenges	2300
<i>Jordan P. Evans</i>	
The Science, Technology and Mission Design for the Laser Astrometric Test of Relativity.....	2308
<i>Slava G. Turyshev</i>	
Reconfigurable Protocol Sensing for Space-based Applications	2324
<i>Clayton Okino, Ryan Mukai, Joshua Schoolcraft, Andrew Gray</i>	
Adaptive Sinkhole Detection on Wireless Ad Hoc Networks.....	2332
<i>Thanachai Thumthawatworn, Tapanan Yeophantong and Punthep Sirikriengkrai</i>	
Multiobjective Energy-aware Node Selection	2342
<i>Qiang Le, Lance M. Kaplan, James H. McClellan</i>	
Adaptive Working Schedule Modeling for Wireless Sensor Networks.....	2453
<i>Piyakul Tillapart, Tapanan Yeophantong, Teerawut Techachaicherdchoo, Thanachai Thumthawatworn, and Umaporn Udomkul</i>	
An Introduction to IEEE STD 802.15.4.....	2362
<i>Jon T. Adams</i>	
Using Wireless Sensor Technologies for Sense and Respond Logistic Applications.....	2370
<i>Mitchell S. Lebold, Brian Murphy, Karl Reichard, Peter Sisa, Joe Gaines</i>	
Energy-Efficiency Analysis of Cluster-Based Routing Protocols in Wireless Sensor Networks.....	2379
<i>Guangyan Huang, Xiaowei Li, Jing He</i>	

Table of Contents

SpaceWire Protocol ID: What Does It Means To You?	2387
<i>Glenn Rakow, Richard Schmurr, Steve Parkes</i>	
Advanced Optical Network	2394
<i>Steve Braun</i>	
Ultrawideband Design Challenges for Wireless Chip-to-Chip Communications and Interconnects	2408
<i>Hasari Celebi, Mustafa E. Sahin, Huseyin Arslan, Jamal Haque, Edward R. Prado, David P. Markell</i>	
An Embedded Microcontroller for Spacecraft Applications	2416
<i>Joe Marshall and Rich Berger</i>	
Development of a High-Speed Multi-Channel Analog Data Acquisition Architecture	2425
<i>Linda M. Theis, Steven C. Persyn, Mark A. Johnson, Kelly D. Smith, Buddy J. Walls, Michael E. Epperly</i>	
Integration of Strontium-Bismuth-Tantalate Capacitors onto SOI Wafers	2434
<i>Karl Strauss, Bruce W. Black, Vikram Joshi, Morifumo Ohno</i>	
Next Generation Radiation-Hardened SRAM for Space Applications	2440
<i>Craig Hafer, Jonathan Mabra, Duane Slocum, T.S. Kalkur</i>	
SEU Mitigation for Reconfigurable FPGAs	2448
<i>David R. Czajkowski, Praveen K. Samudrala, and Manish P. Pagey</i>	
Techniques to Enable FPGA Based Reconfigurable Fault Tolerant Space Computing	2455
<i>Grant Smith and Lou DeLatorre</i>	
High-Performance, Dependable Multiprocessor	2466
<i>Jeremy Ramos, John Samson, David Lupia, Vikas Aggarwal, Minesh Patel, Ian Troxel, Rajagopal Subramaniyan, Adam Jacobs, James Greco, Grzegorz Cieslewski, John Curreri, Michael Fischer, Eric Grobelny, Alan George, Raphael Some</i>	
Hardware/software Interface for High-performance Space Computing with FPGA Coprocessors	2479
<i>James Greco, Grzegorz Cieslewski, Adam Jacobs, Ian A. Troxel, and Alan D. George</i>	
Design and Implementation of Double Precision Floating Point Division and Square Root on FPGAs	2489
<i>Anuja J. Thakkar and Abdel Ejnioui</i>	
Power Remote Input Output ASIC (PRIO)	2496
<i>Mark N. Martin, Kim Strohbehn, Wesley P. Millard, Richard C. Meitzler, Martin E. Fraeman and Stephen E. Jaskulek</i>	
Radiation Tolerant Mixed Signal Microcontroller for Martian Surface Applications	2503
<i>Martin E. Fraeman, Richard C. Meitzler, Mark N. Martin, Wesley P. Millard, Yanyi L. Wong, Joanna D. Mellert, Jessica N. Bowles-Martinez, Kim Strohbehn, David R. Roth</i>	
Reliability Assessment of COB Technology for Extreme Low Temperature Environment	2511
<i>Sharon Ling</i>	
Electrical and Mechanical Characterization of Carbon Nanotube Filled Conductive Adhesive	2521
<i>Jing Li, Janet K. Lumpp</i>	
Embedded Resistors and Capacitors in Organic and Inorganic Substrates	2527
<i>David Gerke and Danielle Ator</i>	
Radiation-tolerant Diffuse Infrared Optical Backplane Development	2544
<i>Richard C. Meitzler, Miriam A. Marwick, Wolfer Schneider</i>	
Run-Time Behavior of Ardea: A Dynamically Reconfigurable Distributed Embedded Control Architecture	2550
<i>Osamah A. Rawashdeh and James E. Lumpp, Jr.</i>	
Spaceflight Multi-Processors with Fault Tolerance and Connectivity Tuned from Sparse to Dense	2565
<i>Laurence E. LaForge, Jeffrey R. Moreland, M. Sami Fadali</i>	
Design of a Novel Soft Error Mitigation Technique for Reconfigurable Architectures	2588
<i>S. Baloch, T. Arslan, A. Stoica</i>	
Extreme Temperature Electronics Using a Reconfigurable Analog Array	2597
<i>Ricardo S. Zebulum, Didier Keymeulen, Joseph Neff, Ramesham Rejeshuni, Taher Daud, Adrian Stoica</i>	

Table of Contents

Data Converters Performance at Extreme Temperatures	2605
<i>Rajeshuni Ramesham, Nikil Kumar, James Mao, Didier Keymeulen, Ricardo S. Zebulum, Adrian Stoica</i>	
Tuning of MEMS Gyroscope using Evolutionary Algorithm and Switched Drive-angle Method.	2617
<i>Didier Keymeulen, Michael I. Ferguson, Luke Breuer, Chris Peay, Boris Oks, Yen-Cheng, Dennis Kim, Eric MacDonald, David Foor, Richard Terrile and Karl Yee</i>	
Design for A/D Converter Reliability for Low Temperature Applications	2625
<i>Yuan Chen, Travis Johnson, Mohammad Mojaradi, Scott Cozy, Elizabeth Kolawa, Lynett Westergard, Curtis Billman</i>	
Solder Joint Fatigue Study Under Low Temperature Martian Conditions	2632
<i>Carissa D. Tudryn</i>	
Star Tracker Focal Plane Evaluation for the JIMO Mission.....	2641
<i>Sergei Jerebets</i>	
Model-Based Design Tools for Extending COTS Components to Extreme Environments.....	2647
<i>H. A. Mantooth, A. Levy, A. M. Francis, E. S. Cilio and A. B. Lostetter</i>	
Extreme Temperature/Radiation Tolerant Crystal Oscillator for High Reliability Space Applications.....	2658
<i>Kouros Sariri</i>	
Ultra-Lightweight, High Efficiency SiC Based Power Electronic Converters for Extreme Environments.....	2665
<i>S. Mounce, B. McPherson, R. Schupbach, A. B. Lostetter</i>	
SiC Devices for Converter and Motor Drive Applications at Extreme Temperatures.....	2684
<i>Volodymyr Bondarenko, Michael S. Mazzola, Robin Kelley, Cai Wang, Yi Liu, Wayne Johnson, Janna Casady</i>	
Low Temperature Performance of COTS Electronic Components for Martian Surface Applications.....	2690
<i>Yogesh Tugnawat and William Kuhn</i>	
Resources Minimization in the Satellite Navigation Process	2699
<i>Mohamed A. Zayan</i>	
Concept of an Algorithm to Determine the Signal Delay Time for Telepresence Space Applications.....	2708
<i>Enrico Stoll, Jürgen Letschnik, Ulrich Walter, Carsten Preusche, Gerd Hirzinger</i>	
Satellite Orbits Guidance Using State Space Neural Network	2715
<i>Mohamed A. Zayan</i>	
Control of an Unstable, Nonminimum Phase Hypersonic Vehicle Model	2731
<i>Michael W. Oppenheimer, David B. Doman</i>	
Application of 2D Differential Geometric Guidance to Tactical Missile Interception.....	2738
<i>Chaoyong Li, Wuxing Jing, Hui Wang, Zhiguo Qi</i>	
Iterative Solution to Three-dimensional Differential Geometric Guidance Problem.....	2744
<i>Chaoyong Li, Wuxing Jing</i>	
Aero-WAVE: A W-band Preliminary Test using HAP.....	2752
<i>A. Jebiril, M. Lucente, T. Rossi, M. Ruggieri, L. Zuliani</i>	
Minimal Fuel Consumption of Electric Propulsion Space Vehicles for Deep Space Exploration	2758
<i>Bandi Bharat Kumar Reddy, Albert C. Esterline, and Abdollah Homaifar</i>	
Multi-Processors by the Numbers: Mathematical Foundations of Spaceflight Grid Computing	2765
<i>Laurence E. LaForge, James W. G. Turner</i>	
A Micro High-Temperature Superconductor System: Fabrication and Operation	2784
<i>Eunjeong Lee, Bongsu Kim, Junseok Ko, Chi Young Song, Seong-Jin Kim, Sangkwon Jeong, and Seung S. Lee</i>	
Image Based Acquisition and Tracking for Multi-Access Laser Communications	2790
<i>Charles W. Hindman, Seth L. Lacy and Nicole Hatten</i>	
Atmospheric and Platform Jitter Effects on Laser Acquisition Patterns	2800
<i>Charles W. Hindman and Brian S. Engberg</i>	

Table of Contents

Development of a Novel, Passively Deployed Roll-Out Solar Array	2808
<i>Douglas Campbell, Rory, Barrett, Mark S. Lake, Larry Adams, Erik Abramson, Mark R. Scherbarth, Jeffry S. Welsh, Gregg Freebury, Neal Beidleman, Jamie Abbot</i>	
Spacecraft Inertia Estimation Via Constrained Least Squares	2817
<i>Jason A. Keim, A. Behcet Acikmese and Joel F. Shields</i>	
Parallel Estimation and Control Architectures for Deep-Space Formation Flying Spacecraft.....	2823
<i>Roy S. Smith and Fred Y. Hadaegh</i>	
Positioning of Satellites Through Continuous Firing	2835
<i>Valerio Nicolai, Marina Ruggieri, Pietro Salvini</i>	
A Modified Minimal Controller Synthesis for Satellite Attitude Control.....	2848
<i>Thawar T Arif</i>	
Robustness of an Optimized Fuzzy Logic Controller to Plant Variations.....	2855
<i>Hossein S. Zadeh, John Wharington and Lorenz Drack</i>	
Low-Cost Propellant Launch to Earth Orbit from a Tethered Balloon	2863
<i>Brian Wilcox</i>	
Uniform Voltage Distribution Control for Series-Input Parallel-Output, Connected Converters.....	2880
<i>Kasemsan Siri, Michael Willhoff, Calvin Truong, Kenneth A. Conner</i>	
A Distributed Design Architecture for Li-ion Battery: Integration of COTS ICs, uCs and CAN Bus	2893
<i>Del Vecchio Blanco, Marco D'Errico, Alessandro Conticchio</i>	
A PV Power Generation System for Missions to Mercury.....	2904
<i>Michele Macellari, Raffaele Russo, Luigi Schirone</i>	
International Intellectual Property Rights for Aerospace Nuclear Power Technologies	2913
<i>William N. Hulsey III,</i>	
Exploring Europa with an RPS-Powered Orbiter Spacecraft.....	2925
<i>Robert D. Abelson, Thomas R. Spilker, James H. Shirley, Jacklyn R. Green, and William D. Smythe</i>	
Development of Segmented Thermoelectric Multicouple Converter Technology.....	2936
<i>Jean-Pierre Fleurial, Kenneth Johnson, Jack Mondt, Jeff Sakamoto, Jeff Snyder, Chen-Kuo Huang, Richard Blair, Gerhard Stapper, Thierry Caillat, Patrick Frye, William Determan, Ben Heshmatpour, Michael Brooks and Karen Tuttle</i>	
Probability Based Partial Triple Modular Redundancy Technique for Reconfigurable Architectures	2946
<i>S. Baloch, T. Arslan, A. Stoica</i>	
Alignment, Capture and Mate (ACM) Docking System Development for Space Exploration	2953
<i>John Ringelberg</i>	
Space-Based Assembly with Symbolic and Continuous Planning Experts.....	2959
<i>Ella Atkins, Gina Moylan, Aaron Hoskins</i>	
Onboard Detection of Jarosite Minerals with Applications to Mars	2967
<i>Benjamin Bornstein, Rebecca Castaño, Martha S. Gilmore, Matthew Merrill, James P. Greenwood</i>	
Opportunistic Rover Science	2974
<i>Rebecca Castano, Tara Estlin, Daniel Gaines, Andres Castano, Caroline Chouinard, Ben Bornstein, Robert C. Anderson, Steve Chien, Alex Fukunaga, and Michele Judd</i>	
Near-Optimal Terrain Collision Avoidance Trajectories Using Elevation Maps	2990
<i>S.M. Malaek, A. Abbasi</i>	
Rapid Development of an Event Tree Modeling Tool Using COTS Software.....	2998
<i>Dev K. Sen, Justin C. Banks, Gaspare Maggio, Jan Railsback</i>	
Infusing Software Assurance Research Techniques into Use	3006
<i>Thomas Pressburger, Ben Di Vito, Martin S. Feather, Michael Hinchey, Lawrence Markosian and Luis C. Trevino</i>	
Planning a Large-Scale Progression of R&D a Pilot Study in the Aerospace Domain.....	3016
<i>Andrew A. Shapiro, Steven L. Cornford, Martin S. Feather, George Price, Yuri O. Gawdiak, Wendell R. Ricks</i>	

Table of Contents

Autonomous Aerial Refueling Based on the Tanker Reference Frame	3030
<i>Steven M. Ross, Meir Pachter, David R. Jacques, Brian A. Kish and Daniel R. Millman</i>	
An On-board Inverter Controlled by the Waveform Switching Technique.....	3052
<i>Michele Macellari, Umberto Grasselli, Luigi Schirone</i>	
AH-1Z Stores Compatibility Testing Lessons Learned.....	3058
<i>Chris Barrett</i>	
Evaluating Landing Aids to Support Helicopter/Ship Testing and Operations.....	3065
<i>Bernard Ferrier and Dean Carico</i>	
Innovative Aircraft/Ship Visual Landing Aid (VLA) Test Tool.....	3078
<i>Robert A. Richards</i>	
Aeroelastic Load Control Program: In-Flight Demonstration of Active Flow Control Technology.....	3086
<i>Leonard Shaw, Raniel C. Hidalgo, James W. Rogers, Gregory J. Burgess, Reynaldo Enriquez, John L. Minor</i>	
Raptor Supersonic JDAM: Faster, Further, Longer.....	3101
<i>Eric Schutte, John Waddington, John Teichert III</i>	
Autonomy Software: V&V Challenges and Characteristics	3107
<i>Johann Schumann and Willem Visser</i>	
Establishment of a System Operating Characteristic for Autonomous Wide Area Search Munitions.....	3113
<i>Brian A. Kish, David R. Jacques, Meir Pachter</i>	
Parallel Region Coverage Using Multiple UAVs.....	3122
<i>Amit Agarwal, Lim Meng Hiot, Nguyen Trung Nghia and Er Meng Joo</i>	
Coordinated Control of Multiple UAVs for Time-Critical Applications.....	3130
<i>Isaac I. Kaminer, Oleg A. Yakimenko, Antonio M. Pascoal</i>	
Hierarchical Decomposition Approach for Pursuit-Evasion Differential Game with Multiple Players.....	3140
<i>Jianhua Ge, Liang Tang, Johan Reimann and George Vachtsevanos</i>	
Coverall Algorithm for Test Case Reduction	3147
<i>Preeyavis Pringsulaka and Jirapun Daengdej</i>	
Verification of Autonomous Systems for Space Applications.....	3155
<i>G. Brat, E. Denney, D. Giannakopoulou, J. Frank and A. Jonsson</i>	
Flexible Generation of Kalman Filter Code	3166
<i>Julian Richardson and Edward Wilson</i>	
Multi-agent System for Managing Human Activities in Space Operations.....	3174
<i>Debra Schreckenghost and R. Peter Bonasso</i>	
COGENCY: Collaborative Communities of Grid-aware Intelligent Agents	3182
<i>Jidé Odubiyi, Chris Rouff and Paul Chi</i>	
AEGONE-Agent-Enabled, Grid-Oriented, and Just-in-time Network of Experts	3189
<i>Walt F Truskowski, Jidé B Odubiyi</i>	
An Agent-Based Approach to Distributed UAV and Sensor Planning Systems	3196
<i>Raymond Budd and Dana Moore</i>	
An Agent-based Tetrahedral Walker.....	3206
<i>Charles Sebens and Walt Truskowski</i>	
Agent-Based Simulation to Evaluate Technology and Concepts for the National Airspace System.....	3213
<i>Shailendra Mehta, Liviu Nedelescu, Michael Nolan, Kyle Krull, Jim Whitford, Mike Pfleiderer, Cheemun Foong</i>	
On Detection Networks and Iterated Influence Diagrams: Application to a Parallel Distributed Structure.....	3234
<i>Haiying Tu, Satnam Singh, Krishna R. Pattipati, Peter Willett</i>	
Low-Thrust Mission Trade Studies with Parallel, Evolutionary Computing.....	3242
<i>Seungwon Lee, Ryan P. Russell, Wolfgang Fink</i>	

Table of Contents

A Framework for the Design Optimisation of Aerospace Platforms using Intelligent Technologies	3254
<i>Lorenz Drack</i>	
Command and Control Concepts within the Network-Centric Operations Construct	3262
<i>Paul W. Phister, Jr and John D. Cherry</i>	
A Review of Time Critical Decision Making Models and Human Cognitive Processes	3271
<i>Ron Azuma, Mike Daily, Chris Furmanski</i>	
Automatic Speech Recognition Fusion Approach to Unsupervised Speaker Clustering and Labeling	3280
<i>A. D. Lawson, M. C. Huggins, J. J. Grieco, S. A. Galligan, D. M. Harris</i>	
Sensing Super-position: Visual Instrument Sensor Replacement	3286
<i>David A. Maluf and John F. Schipper</i>	
Knowledge Mining Application in ISHM Testbed	3296
<i>William J. McDermott, Peter Robinson, Daniel P. Duncavage</i>	
Operationally Significant Patterns of Association	3305
<i>William C. Hardy and Richard W. La Valley</i>	
Metrics-Based Test and Evaluation of Group Detection Software for Counter-Terrorism	3315
<i>Thomas Garwin, Matthew P. Crozat, Brian L. Merrell and Brad Bebee</i>	
Applying LSI and Data Reduction to XML for Counter Terrorism	3332
<i>S. Demurjian, S. Rajasekaran, R. Ammar, I. Greenshields, T. Doan, and L. He</i>	
An Infrastructure for Automating Information Sharing in Analytic Collaboration	3343
<i>Gregory A. Mack, David Fado, M. Brian Blake, Dominic Widdows</i>	
Creative Activity Modeling for Handling Surprises in Asymmetric Attacks	3354
<i>Tapanan Yeophantong, Jirapun Daengdej and Pratit Santiprabhob</i>	
Hardware Accelerated Algorithms for Semantic Processing of Data Streams	3362
<i>Stephen G. Eick, John W. Lockwood, Justin Mauger, Alan Ratner, John Byrnes, Ron Loui, Doyle J. Weishar, Andrew Levine</i>	
An Architecture for Streaming Coclustering in High Speed Hardware	3376
<i>John Byrnes and Richard Rohwer</i>	
A Survey of Techniques to Visualize Streaming Textual Datasets	3386
<i>Stephen G. Eick and David Bruce Cousins</i>	
Considerations for a Framework to Provide Enhanced Perception of NLOS Threats and Targets	3394
<i>Dana Moore, Dzulkifli Scherber and William Wright</i>	
Assessing Nation-State Instability and Failure	3404
<i>Robert Popp, Stephen H. Kaisler, David Allen, Claudio Cioffi-Revilla, Kathleen M. Carley, Mohammed Azam, Anne Russell, Nazli Choucri, Jacek Kugler</i>	
Automated Population of Dynamic Bayes Nets for Pre-Conflict Analysis and Forecasting	3422
<i>Anne Russell, Mark Clark, Greg Mack, Sudipto Ghoshal, Krishna Pattipati</i>	
Supporting Decisions with (Less Than Perfect) Social Science Models	3433
<i>Steve Bankes, Steven Popper, Robert Lempert</i>	
Understanding & Modeling State Stability: Exploiting System Dynamics	3440
<i>Nazli Choucri, Christi Electris, Daniel Goldsmith, Dinsha Mistree, Stuart E. Madnick, J. Bradley Morrison, Michael D. Siegel, Margaret Sweitzer-Hamilton</i>	
Ontological Approach to Improving Design Quality	3451
<i>Allyson M. Hoss and Doris L. Carver</i>	
An Executable Choreography Framework for Dynamic Service-Oriented Architectures	3463
<i>Faisal Akkawi, Daryl P. Fletcher, Thomas Cottenier, Daniel P. Duncavage, Richard L. Alena and Tzilla Elrad</i>	
Software Architecture of Sensor Data Distribution in Planetary Exploration	3476
<i>Charles Lee, Richard L. Alena, Thom Stone, John Ossenfort, Ed Walker and Hugo Notario</i>	

Table of Contents

On Certain Theoretical Developments Underlying the Hilbert-Huang Transform.....	3485
<i>Semion Kizhner, Karin Blank, Thomas Flatley, Norden E. Huang, David Petrick, Phyllis Hestnes</i>	
The Deep Impact Flight Software Architecture.....	3499
<i>Richard Hess Jr., and Jacob Torrez</i>	
Agile Language Development: The Next Generation	3508
<i>William Wright and Dana Moore</i>	
CompreX: Further Developments in XML Compression	3514
<i>Kirk J. Swanson and Jason Judt</i>	
AstroLogic: Using XML in a Spacecraft-Focused Client-Server System	3521
<i>Scott A. McDermott</i>	
An Approach for Detecting Deception in Agents.....	3536
<i>Pimphun Pradchayakool, Jirapun Daengdej and Supannika Koolmanojwong</i>	
Realizing Organizational Collaboration through Semantic Mediation	3546
<i>Sri Gopalan, Sandeep Maripuri, Brad Medairy</i>	
Geospatial Semantic Web: Architecture of Ontologies	3561
<i>Dave Kolas, Mike Dean and John Hebel</i>	
Perspective Models as a Means for Achieving True Representational Accuracy	3571
<i>Kym Pohl</i>	
An Integrated Approach to the Development of an Intelligent Prognostic Health Management System.....	3578
<i>Rob Callan, Brian Larder and John Sandiford</i>	
Integrating development- and support tools for PHM in Saab 39 Gripen.	3590
<i>Torbjrn Fransson</i>	
Benefits of IVHM- An Analytical Approach	3602
<i>Zachary C. Williams</i>	
Wire integrity Management Using Sensors On-board Manned Aero-spacecraft.....	3611
<i>Jim Cockrell, Phil Wysocki, Ralph Hodgson, Sidney Bailin</i>	
Recorders, Reasoners and Artificial Intelligence Integrated Diagnostics on the C-17 Aircraft.....	3623
<i>Bala Chidambaram, Philippe L Horn, Daniel D Gilbertson, Paul Pigg, Mark A Talbot and Kirk C Cerise</i>	
Discriminant Analysis for Helicopter Rotor Vibration Prognostics.....	3632
<i>Ruben Avila, Pat Banerjee, David He, Eric Bechhoefer</i>	
Fixing BIT on the V-22 Osprey.....	3646
<i>Kerry Westervelt</i>	
Recent Case Studies in Bearing Fault Detection and Prognosis	3657
<i>Carl S. Byington, Rolf Orsagh, Pattada Kallappa, Jeremy Sheldon, Michael DeChristopher, Sanket Amin, Jason Hines</i>	
Propulsion Safety and Affordable Readiness Engine Health Management Plan.....	3665
<i>Brian K. Beachkofski</i>	
The SECAD Project - Vulnerability Reduction via Propulsion Control Logic.....	3671
<i>Alan D. Pisano and Charles E. Frankenberger</i>	
Validation of a COTS EHM Solution for the JSF Program	3679
<i>Dr. Somnath Deb, Venkata N. Malepati, Michel D. Paquet and Baban Baliga</i>	
Modeling and Simulation of Vibration Signatures in Propulsion Subsystems.....	3686
<i>Nancy Lybeck, Brogan Morton, Sean Marble, Andrew Hess, John Kelly</i>	
Investigation of Tapered Roller Bearing Damage Detection Using Oil Debris Analysis.....	3694
<i>Paula Dempsey, Gary Kreider and Thomas Fichter</i>	

Table of Contents

Improving the Maintenance Process and Enabling Prognostics for Control Actuators using CAHM Software.....	3705
<i>Matthew Watson and Carl S. Byington</i>	
Simulation-Based Health and Contingency Management.....	3713
<i>Michael J. Roemer, Liang Tang, Greg Kacprzyński, Jianhua Ge and George Vachtsevanos</i>	
Why Prognostics for Avionics?.....	3724
<i>Herb Hecht</i>	
Prognostic Health Management for Avionic Systems.....	3730
<i>Rolf F. Orsagh, Douglas W. Brown, Patrick W. Kalgren, Carl S. Byington, Andrew J. Hess and Thomas Dabney</i>	
Aircraft Electrical Power Systems Prognostics and Health Management.....	3737
<i>Kirby Keller, Kevin Swearingen, Jim Sheahan, Mike Bailey, Jon Dunsdon, Bishop Cleeve, K. Wojtek Przytula, Brett Jordan</i>	
An Intelligent Hierarchical Approach to Actuator Fault Diagnosis and Accommodation	3749
<i>Xiaodong Zhang, Yong Liu, Rolf Rysdyk, Chimán Kwan, Roger Xu</i>	
A Hybrid Prognostic Model Formulation System Identification and Health Estimation of Auxiliary Power Units.....	3764
<i>Pradeep Shetty, Dinkar Mylaraswamy, Thirumaran Ekambaram</i>	
Real Time Estimation of Battery Impedance	3774
<i>J. L. Morrison, W. H. Morrison</i>	
Development and Test of a Real Time Battery Impedance Estimation System	3787
<i>R. G. Hoffmann, J. E. Slade, J. L. Morrison</i>	
Field Data Evaluation and Continuous Health Assessment of Critical Avionics Subsystem Degradation.....	3795
<i>Philip L. Dussault, Carl S. Byington, Patrick W. Kalgren and Anthony J. Boodhansingh</i>	
Optimisation of Fusion and Decision Making Techniques for Affordable SPHM.....	3803
<i>Hesham Azzam, Frank Beaven, Malcolm Wallace and Iain Hebden</i>	
Embedded Resistive Strain Sensors for Harsh Environments.....	3813
<i>Christopher Gouldstone, Jeff Brogan, Rob Greenlaw, Richard J Gambino, Jonathan Gutleber, Sanjay Sampath, Jon Longtin</i>	
Disk Crack Detection and Diagnosis for Gas Turbine Engines	3823
<i>Wenyi Wang</i>	
Adaptive Control of Actuator Lifetime.....	3834
<i>L. Gokdere, A. Bogdanov, S. Chiu, K. Keller, J. Vian</i>	
Layered Classification for Improved Diagnostic Isolation in Drivetrain Components	3845
<i>Matthew J. Smith, Carl S. Byington, Patrick Kalgren, Ashish Parulekar, Michael DeChristopher</i>	
Analytical Mechanical Diagnostic Benefits: Case Studies.....	3853
<i>David Hochmann and Greg Baringer</i>	
Mechanical Diagnostics System Engineering in IMD-HUMS.....	3863
<i>Eric Bechhoefer, Eric Mayhew</i>	
On Handling Dependent Evidence and Multiple Faults in Knowledge Fusion for Engine Health Management.....	3871
<i>Valerie Guralnik, Dinkar Mylaraswamy, Hal Voges</i>	
On False Alarm Mitigation	3880
<i>Joel R. Bock, Tom Brotherton, Paul Grabill, Doug Gass and Jonathan A Keller</i>	
Use of Non-Gaussian Distribution for Analysis of Shaft Components.....	3895
<i>Eric Bechhoefer and Andreas P.F. Bernhard</i>	
An Efficient Framework for the Conversion of Fault Trees to Diagnostic Bayesian Network Models	3904
<i>K. Wojtek Przytula, Richard Milford</i>	
Using Sensitivity Analysis to Validate Bayesian Networks for Airplane Subsystem Diagnosis.....	3918
<i>Haiqin Wang</i>	

Table of Contents

Not-So-Naive Bayesian Networks and Unique Identification in Developing Advanced Diagnostics.....	3928
<i>John W. Sheppard, Stephyn G. W. Butcher, Mark A. Kaufman and Craig MacDougall</i>	
An Intelligent Agent-based Self-evolving Maintenance and Operations Reasoning System.....	3941
<i>Liang Tang, Gregory J. Kacprzyński, Joel R. Bock and Michael Begin</i>	
Recent Advances in IEEE Standards for Diagnosis and Diagnostic Maturation.....	3953
<i>John W. Sheppard and Timothy J. Wilmering</i>	
Framework for Post-Prognostic Decision Support	3962
<i>Naresh Iyer, Kai Goebel, Piero Bonissone</i>	
Discovering Atypical Flights in Sequences of Discrete Flight Parameters	3972
<i>Suratna Budalakoti, Ashok N. Srivastava, Ram Akella</i>	
A Model Based Approach to Constructing Performance Degradation Monitoring Systems.....	3980
<i>Gautam Biswas and George Bloor</i>	
Enterprise Search Tasks in IVHM Practice	3990
<i>David R Throop</i>	
Performance Analysis using a Fuzzy Rule Base Representation of the Cooper-Harper Rating	3997
<i>Chris Tseng, Pramod Gupta, Johann Schumann</i>	
PHM Sensor Implementation in the Real World a Status Report.....	4003
<i>Ari Novis and Honor Powrie</i>	
Gas Path Debris Monitoring for F-35 Joint Strike Fighter Propulsion System PHM.....	4012
<i>Honor Powrie and Ari Novis</i>	
FUMSTM Fusion and Decision Support for Intelligent Management of Aircraft Data	4020
<i>Hesham Azzam, Jonathan Cook, Peter Knight and Ed Moses</i>	
Fusing Competing Prediction Algorithms for Prognostics	4036
<i>Kai Goebel, Neil Eklund, Pierino Bonanni</i>	
Embedded Temperature and Heat Flux Sensors for Advanced Health Monitoring of Turbine Engine Components.....	4046
<i>Jonathan Gutleber, Jeffrey Brogan, Richard J Gambino, Christopher Gouldstone, Robert Greenlaw, Sanjay Sampath, Jon Longtin, Dongming Zhu</i>	
Development of a Vibration-Powered Wireless Temperature Sensor and Accelerometer for Health Monitoring.....	4055
<i>Sue George</i>	
Analyzing and Optimizing the System of Sensors.....	4063
<i>Amir Fijany and Farrokh Vatan</i>	
A Kennedy Space Center Implementation of IEEE 1451 Networked Smart Sensors and Lessons Learned	4071
<i>Rebecca L. Oostdyk, Carlos T. Mata, José M. Perotti</i>	
Predicting the Remaining Life of Propulsion System Bearings.....	4091
<i>Sean Marble and Brogan P. Morton</i>	
Probabilistic Model Based Algorithms for Prognostics.....	4099
<i>David He, Shenliang Wu, Pat Banerjee, Eric Bechhoefer</i>	
Prognostics Usefulness Criteria	4109
<i>J. Kevin Line, N. Scott Clements</i>	
Challenges, Issues, and Lessons Learned Chasing the Big P: Real Predictive Prognostics Part 2.....	4116
<i>Andrew Hess, Giulio Calvello, Peter Frith, Mr. Stephen J. Engel, David Hoitsma</i>	
Electronics Reliability Prognosis Through Material Modeling and Simulation	4135
<i>Loren Nasser, Maggie Curtin</i>	
Prognostics Modeling of Solder Joints in Electronic Components.....	4142
<i>Jeffrey W. Simons and Donald A. Shockey</i>	

Table of Contents

A Board-Level Prognostic Monitor for MOSFET TDDB	4148
<i>D. Goodman, B. Vermeire, J. Ralston-Good, R. Graves</i>	
A Demonstration of Embedded Health Management Technology for the HEMTT LHS Vehicle	4154
<i>Jeffrey Banks, Brian Murphy and Karl Reichard</i>	
Applied Neural Network for Navy Marine Gas Turbine Stall Algorithm Development	4162
<i>Daniel Caguiat, John Scharschan, David Zipkin, James Nicolo</i>	
Diagnostic End to End Monitoring & Fault Detection for Braking Systems	4177
<i>Brian Murphy, Mitchell Lebold, Jeff Banks, Karl Reichard</i>	
Prognostics and Advanced Diagnostics for Improving Steady-State and Pulse Reliability	4185
<i>Yevgeny Macheret</i>	
Modeling of Hydraulic Systems Tailored to Diagnostic Fault Detection Systems	4196
<i>Brian J. Murphy, Jeff C Banks, Karl Reichard</i>	
Emerging Technologies for V&V of ISHM Software for Space Exploration	4204
<i>Martin S. Feather and Lawrence Z. Markosian</i>	
ISS as a Testbed for Advanced Health Management and Automation Technologies	4219
<i>Carlos Garcia-Galan, Daniel Duncavage, Olu Olofinboba</i>	
Entropy Based Anomaly Detection Applied to Space Shuttle Main Engines	4236
<i>Adrian Agogino and Kagan Tumer</i>	
Enabling the Discovery of Recurring Anomalies in Aerospace Problem Reports	4243
<i>Ashok N. Srivastava, Ram Akella, Vesselin Diev, Sakthi Preethi Kumaresan, Dawn M. McIntosh, Emmanuel D. Pontikakis, Zuobing Xu, Yi Zhang</i>	
Spacelift Telemetry Acquisition and Reporting System Limit Checking	4260
<i>K. Richardson, Z. Petrosyan, R. Abbott, D. Scott, M. Hajianpour, S. Ghantiwala, K. Marabyan, A. Quan, R. Crawford, D. Nystrom</i>	
Bearing Health Monitoring and Life Extension in Satellite Momentum/Reaction Wheels	4268
<i>Sean Marble, David Tow</i>	
James Webb Space Telescope XML Database: From the Beginning to Today	4275
<i>Jonathan Gal-Edd and Curtis C. Fatig</i>	
Bridging ESA and NASA Worlds: Lessons Learned from the Integration of hifly/SCOS-2000 in NASAs GMSEC	4282
<i>Jean-Pierre Chamoun, Steve Risner, Theresa Beech, Gonzalo Garcia</i>	
SCOS-2000 Release 4.0: Multi-mission/Multi-Domain Capabilities in ESA SCOS-2000 MCS Kernel	4290
<i>Rafael Vázquez Osorio, Javier Portela Lemos, Theresa W. Beech, Gonzalo Garcia Julian, Jean-Pierre Chaumon</i>	
Satellite Test and Operation Procedures Cost Reduction Through Standardization	4307
<i>Stuart James Cater and David Quigley</i>	
Lessons Learned from Engineering a Multi-Mission Satellite Operations Center	4317
<i>Maureen Madden, Everett Cary Jr., Timothy Esposito, Jeffrey Parker, David Bradley</i>	
hiflyViews: New Generation Telemetry Visualization	4328
<i>Juan-Carlos Gil, Thomas Morel, Luis Pastor, Theresa W. Beech, Gonzalo Garcia, Jean-Pierre Chaumon</i>	
Thunderstorm Solar Power Satellite-Issues Dealing with Weather Modification	4335
<i>Bernard J. Eastlund and Lyle M. Jenkins</i>	
Commercial-Off-The-Shelf Workflow Package As a Platform for Mission Planning Data Integration	4343
<i>Alexandre Popov</i>	
Human Performance Considerations for a Mars Mission	4358
<i>Leslie A. Wickman</i>	
SmartRings: Advanced Tool for Communications Satellite Payload Reconfiguration	4368
<i>Jean-Pierre Chaumon, Juan-Carlos Gil, Theresa W. Beech, Gonzalo Garcia</i>	

Table of Contents

MAESTRO: The Versatile Command and Control System Software for Mission Operations and Testing	4379
<i>David D. Chevers, Thomas Itchkawich, Darcie Durham</i>	
Automation of Satellite Requirement Verification	4387
<i>Stuart James Cater, David Quigley, Dohyung B. Ahn</i>	
Development in Space Projects and the Insurance Market: New Frontiers in Risk Management	4396
<i>Mariagrazia Spada</i>	
The Deep Impact Test Benches: Two Spacecraft, Twice the Fun	4402
<i>Paula J. Pingree</i>	
Investigation of a Phantom Disturbance Torque Sensed on Space Station during Russian EVAs	4411
<i>Yared Mesfin</i>	
Investigation of the Crew Induced Disturbance to the ISS GN&C System	4419
<i>Nujoud F. Merancy</i>	
Achieving Operability via the Mission System Paradigm	4426
<i>Fred J. Hammer and Joseph R. Kahr</i>	
Probabilistic Cost, Risk, and Throughput Analysis of Lunar Transportation Architectures	4436
<i>Kristina Alemany, John R. Olds</i>	
A Group Decision-Making Interface for Conceptual Design	4455
<i>Gary M. Stump, Mike Yukish, John J. O'Hara</i>	
Tools to Support Human Factors and Systems Engineering Interactions During Early Analysis	4466
<i>Carroll Thronesbery, Jane T. Malin, Kritina Holden, Danielle Paige Smith</i>	
Model-Based Spacecraft and Mission Design for the Evaluation of Technology	4475
<i>Ben S. Bieber, Chester Ong, Jennifer M. Needham, Bing Huo, Angela C. Magee, Craig S. Montouri, Chi Won Ko, Craig E. Peterson</i>	
Next-Generation Concurrent Engineering: Developing Models to Complement Point Designs	4485
<i>Elisabeth Morse, Tracy Leavens, Babak Cohanim, Corey Harmon, Eric Mahr and Brian Lewis</i>	
Orbital Payload Delivery Using Hydrogen and Hydrocarbon Fuelled Scramjet Engines	4500
<i>Matthew Tetlow and C.J. Doolan</i>	
Problem Formulation for Optimal Array Modeling and Planning	4509
<i>Kar-Ming Cheung, Charles H. Lee and Jeannie Ho</i>	
Experiences in Managing the Prometheus Project	4517
<i>David H. Lehman, Karla B. Clark, Beverly A. Cook, Sarah A. Gavit, Sammy A. Kayali, John C. McKinney, David A. Milkovich, Kim R. Reh, Randall L. Taylor, and John R. Casani and Therese Griebel</i>	
Acquisition Strategy and Source Selection for Co-designing a New-Development Spacecraft	4529
<i>Randall L. Taylor</i>	
System Architecture Modeling for Technology Portfolio Management using ATLAS	4542
<i>Bob Thompson</i>	
Project-Line Interaction: JPLs Matrix	4551
<i>Lynn E. Baroff</i>	
Improving Inter-Organizational Baseline Alignment in Large Space System Development Programs	4558
<i>Donald R. Greer, Laura J. Black, Richard J. Adams</i>	
Aligning Technology, Procedures, Operations, Programs, and People to Grow Capacity	4573
<i>Gisele Mohler</i>	
The NASA Program Management Tool: A New Vision in Business Intelligence	4582
<i>David G. Bell, David A. Maluf, Yuri Gawdiak, Peter Putz and Keith Swanson</i>	
Context Based Configuration Management	4589
<i>Yuri Gawdiak, Mohana Gurram, David Bell and David Maluf</i>	

Table of Contents

Advancing the Practice of Systems Engineering at JPL	4597
<i>P. A. "Trisha" Jansma and Ross M. Jones</i>	
Using a Lessons Learned Process to Develop and Maintain Institutional Memory and Intelligence	4616
<i>Donald R. Mendoza and Ronald Johnson</i>	
Vulnerabilities, Influences and Interaction Paths: Failure Data for Integrated System Risk Analysis	4626
<i>Jane T. Malin and Land Fleming</i>	
The Near-Miss Bias in Decision Making	4637
<i>R.L. Dillon, Edward W. Rogers and Catherine H. Tinsley</i>	
Improving the Application of Risk Management	4644
<i>Karl Davey</i>	
Risk Assessment Practices at NASA: Studies of Design and Review Methods	4650
<i>Lawrence P. Chao and Irem Tumer</i>	
Simulation Based Acquisition for the Rest of Us	4662
<i>Michael S. Anderson, Puja Gupta and Michelle W. Chen</i>	
Simulated Moon, Mars, and Beyond	4669
<i>Tom Cummings</i>	
Creating a Tool Independent System Engineering Environment	4681
<i>James E. Pederson</i>	
ANSI/AIAA Guide for Estimating Spacecraft Systems Contingencies Applied to the NASA GLAST Mission	4689
<i>Norman Rioux</i>	
Automated Design of Spacecraft Power Subsystems	4706
<i>Richard J. Terrile, Mark Kordon, Dan Mandutianu, Jose Salcedo, Eric Wood and Mona Hashemi</i>	
Validation (not just Verification) of Deep Space Missions	4720
<i>Riley Duren</i>	
Integrating Three Level 2 CMMI Process Areas: Closing the Loop on Software Project Management	4733
<i>Mike Ross</i>	
Financial Catscans and Time	4750
<i>Douglas K. Howarth</i>	
Do Higher Cost Reserve Levels for Space Science Missions Ensure Good Cost Performance?	4768
<i>Mark Jacobs and Shawn Hayes</i>	
A Solar-Power Design Competition Inspiring Student Interest in Engineering	4776
<i>Eric MacDonald, Scott A. Starks, Sally Blake</i>	