David B. Spencer, Ph.D.

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PROFESSIONAL EXPERIENCE

2012-present	Professor, Department of Aerospace Engineering, The Pennsylvania State University
2008-2011	Director of Graduate Programs, College of Engineering, The Pennsylvania State University
2005-2012	Associate Professor, Department of Aerospace Engineering, The Pennsylvania State University
2004-2008	Director of Graduate Studies, Department of Aerospace Engineering, The Pennsylvania State University
Summer 2002	Member of the Technical Staff, NASA Jet Propulsion Laboratory (ASEE Summer Faculty Fellowship Program)
1999-2005	Assistant Professor, Department of Aerospace Engineering, The Pennsylvania State University
1998-1999	Deputy Branch Chief, Space Sensing and Vehicle Control Branch, Air Force Research Laboratory
1996-1999	Chief, Space Flight Dynamics and Control Group, and Space Debris Research Program Manager, Air Force Research Laboratory
1995-1996	Space Debris Research Program Manager and Orbital Dynamics Program Manager, Air Force Phillips Laboratory
1994-1995	Deputy Space Debris Research Program Manager and Orbital Dynamics Program Manager, Air Force Phillips Laboratory
1990-1994	Air Force Senior Knight Fellow, University of Colorado, Boulder and Aerospace Engineer, Air Force Phillips Laboratory
1985-1990	Member of the Technical Staff, Astrodynamics Department, The Aerospace Corporation
1983-1985	Graduate Research Assistant, School of Aeronautics and Astronautics, Purdue University

EDUCATION

Ph.D. in Aerospace Engineering Sciences,
University of Colorado, Boulder, Colorado
Dissertation: *An Analytical Solution Method for Near-Optimal, Continuous-Thrust Orbit Transfers*
Dissertation Advisor: Robert D. Culp

Master of Business Administration (M.B.A.)
The Pennsylvania State University, University Park, Pennsylvania

M.S. in Aeronautics and Astronautics,
Purdue University, West Lafayette, Indiana
Thesis: *The Gravitational Influences of a Fourth Body on Periodic Halo Orbits*
Thesis Advisor: Kathleen C. Howell

B.S. in Mechanical Engineering,
University of Kentucky, Lexington, Kentucky

HONORS AND AWARDS

Corresponding Member, International Academy of Astronautics, 2015
Fellow, AAS, 2011
AIAA Sustained Service Award, 2008
SAE Ralph R. Teetor Educational Award, 2006
Penn State Engineering Society (PSES) Outstanding Teaching Award, 2004
Associate Fellow, AIAA, 1998
USAF Palace Knight Senior Fellow, 1991-1994
Tau Beta Pi, National Engineering Honorary, 1984
Pi Tau Sigma, National Mechanical Engineering Honorary, 1983

ACADEMIC AND PROFESSIONAL SERVICE HIGHLIGHTS

Service Activities

Penn State Graduate Council 2011-present
- Chair, Committee on Graduate Research, 2012-present
- Chair, Committee on Committees and Procedures, 2014-present

University Faculty Marshal, 2010-present
Penn State Faculty Senate (Senate Committee on Research), 2005-2009
College of Engineering Faculty Council, 2001-2006

Chair, 2004-2005
Vice Chair, 2003-2004
Secretary, 2002-2003
College of Engineering Academic Integrity Committee, 2013-present (Chair, 2014-present)
External Advisory Board, Department of Mechanical Engineering, University of Kentucky, 1998-2009

Journal Activities
Associate Editor, *Journal of Spacecraft and Rockets*
Reviewer, *Journal of Optimization Theory and Applications*
Reviewer, *Journal of Aerospace Engineering*
Reviewer, *Celestial Mechanics and Dynamical Astronomy*
Reviewer, *Journal of Spacecraft and Rockets*
Reviewer, *Journal of Guidance, Control, and Dynamics*
Reviewer, *Journal of the Astronautical Sciences*
Reviewer, *Transactions on Geoscience and Remote Sensing* (IEEE)
Reviewer, *Acta Astronautica*
Reviewer, *Journal of Aerospace Information Systems*
Reviewer, *Advances in Space Research*

Professional Society Activities and Memberships
Vice President, Publications, AAS, 2006-2010, 2014-present
Vice President, Technical, AAS, 2010-2014
Chair (Founding), AAS International Space Station Utilization Technical Committee, 2012-2014
Chair, AIAA Astrodynamics Technical Committee, 2004-2006
Member, AIAA Astrodynamics Technical Committee, 1995-2001, 2002-present
Member, AAS Spaceflight Mechanics Technical Committee, 1996-2002
Member, AIAA Public Policy Committee, 2002-present
Member, International Astronautical Federation Astrodynamics Committee, 2009-2014
Member, International Astronautical Federation Space Education and Outreach Committee, 2009-present
Fellow, AAS, 2011
Associate Fellow, AIAA, 1998
Member, American Society of Engineering Education
Member, American Society of Mechanical Engineers

Symposium Activities
Technical Chair
2014 3rd Annual ISS Research and Development Conference

2013 2nd Annual ISS Research and Development Conference
2012 1st Annual ISS Research and Development Conference
2004 AIAA/AAS Astrodynamics Specialists Conference
2001 AAS/AIAA Astrodynamics Specialists Conference

General Chair

2012 AIAA/AAS Astrodynamics Specialists Conference
1997 AAS/AIAA Astrodynamics Specialists Conference

Session Chair

International Astronautical Congress – 2010, 2011, 2012, 2013, 2014
AIAA/AAS Astrodynamics Specialists Conference – 1994, 2000, 2002, 2006, 2008, 2014
AAS/AIAA Astrodynamics Specialists Conference – 2003, 2005, 2007, 2009, 2011
AAS/AIAA Space Flight Mechanics Meeting – 1995, 1996, 1998, 1999, 2000, 2002, 2003, 2005, 2006, 2007, 2010, 2011, 2012, 2013, 2014

Organizing Committees for several conferences, symposia, and workshops

ACADEMIC INSTRUCTION

Interplanetary Astrodynamics (AERSP 597C) – Spring 2009, 2013
Astrodynamics (AERSP 550) – Spring 2001, 2002, 2003, 2004, 2016
Statistical Orbit Determination (AERSP 597C) – Spring 2005, 2007, 2011, 2015
Orbit and Attitude Control of Spacecraft (AERSP 450) – Fall 2001, 2003-2008, 2010, 2012-2015
Preliminary Spacecraft Design (AERSP 401A) – capstone design, Fall 2001-2004, 2009, 2011, 2013, 2015
Detailed Spacecraft Design (AERSP 401B) – capstone design, Spring 2002-2005, 2010, 2012, 2014, 2016
Introduction to Astronautics (AERSP 309) – Fall 1999-2002, 2007
Dynamics and Control of Aerospace Systems (AERSP 304) – Spring 2000, 2012
Aerospace Explorer (AERSP 001S) – First Year Seminar, Fall 2004, 2006, 2008, 2011, 2012, 2014; Spring 2006, 2007, 2009, 2013, 2015
Hands-on Space – rocketry project integrated into senior laboratory courses and senior and graduate student independent studies

GRADUATE AND UNDERGRADUATE HONORS THESES SUPERVISED

Current Students

Ph.D. Students

Student Name **Dissertation Topic**

Davide Conte	Characterization of The Relative Motion Between Two Spacecraft in Close Proximity in the Restricted Three-body Problem (working title)

M.S. Students

Student Name	**Thesis Topic**
Andrew Goodyear	Optimal Low-Thrust Geostationary Transfer Orbit Using a Hybrid Pseudospectral Collocation Method
Jason Reiter	TBD
Mark Bolden	TBD
Peter Scarcella	Parametric Trade Study of Multiple Libration Point Orbits in the Circular Restricted Four-Body Problem
Koundinya (Ken) Kuppa	Long-Term Orbit Propagation Using Symplectic Integration Algorithms
Mollik Nayyar	Optimal Low-Thrust Transfers from Lagrange Point Orbits Using Particle Swarm Optimization (working title)

Former Students

Ph.D. Students

Student Name	**Date**	**Dissertation Title**
Andrew Abraham (Lehigh Univ.)	5/14	Particle Swarm Optimization of Low-Thrust, Geocentric-to-Halo-Orbit Transfers
Patrick Williams	12/12	Managing Space Situational Awareness Using the Space Surveillance Network
Young Tae Ahn	12/12	Attitude Dynamics and Control of a Spacecraft Using Shifting Mass Distributions
Jung Soo Kim (co-advise with J. Urbina)	8/11	Improvement in Thermospheric Neutral Density Estimation of the Numerical TIE-GCM
Julio Benavides	12/10	Trajectory Design Using Approximate Analytic Solutions of the N-Body Problem
Christopher Scott	5/10	Transfer and Capture into Distant Retrograde Orbits
Matthew Ferringer	8/09	General Framework for the Reconfiguration of Satellite Constellations
Hideaki Yamato	8/03	Trajectory Design Methods for Restricted Problems of Three Bodies with Perturbations

M.S. Students

Student Name	Date	Thesis Title
Skyler Shuford	12/15	Delta-V Feasibility of Piggyback Lunar Transfers
Lawrence DiGirolamo	12/14	A Hybrid Stochastic Motion Planning Algorithm for Safe and Efficient, Close Proximity, Autonomous Spacecraft Missions
J.P. Muncks	12/14	An Investigation into the Accuracy of Orbit Determination Methods for Planetary Landers
Michael Policelli	8/14	Hybridized Vertical Takeoff Vertical Landing Spacecraft Trajectory Optimization via Direct Collocation and Evolutionary Algorithms
Davide Conte	5/14	Determination of the Optimal Earth-Mars Trajectories to Target the Moons of Mars
Christopher Hassa (co-advise with S. Bilén)	12/13	Drag Coefficient Estimation Using Satellite Attitude and Orbit Data
Philip Myers	5/13	Application of a Multi-Objective Evolutionary Algorithm to Spacecraft Stationkeeping
Brian Shank	5/13	Development of an Optimized Lambert Problem Solver for Targeting Elliptical Orbits
Christopher Polito	5/11	The Effect of Variable Initial Uncertainty on the Probability of Asteroid-Earth Collisions
Christopher Binz	5/10	Designing for the Space Environment via Trade Space Exploration
Dan Jordan	5/09	Trade Space Application of Trade Space Visualization to Discrete and Continuous Complex Dynamical Systems
Patrick Williams	5/09	Using Numerical Optimization Techniques and General Perturbation Equations to Find Optimal Near-Earth Orbit Transfers
Jung Soo Kim	5/08	Numerical Comparison and Calibration of Atmospheric Density Models
Julio Benavides	5/07	Orbit Insertion into Triangular Libration Points in the Restricted Three-Body Problem
Theodore Stodgell	12/06	Multiobjective Evolutionary Optimization of Satellite Rendezvous Tours
Denise Brown	12/06	Optimal Maneuver Determination for Formation Flying Satellite Constellations

Jeffrey O'Malley	8/06	Formation Flight Control Near a Collinear Libration Point for Interferometric Aperture Plane Modeling
Christopher Bessette	5/06	Optimal Interplanetary Trajectories via Evolutionary Algorithms
Abraham Mathew	8/05	Incorporating Cooperative Learning Activities into Traditional Aerospace Engineering Curricula
Dennis Haeberle	5/05	Investigation of Interplanetary Navigation Using Large Antenna Arrays with Varied Baselines
Ryan Kobrick	5/05	Optimizing Trajectories for Suborbital Human Spaceflight
Chris Scott	5/05	Optimal Bounded Low-Thrust Reconfiguration for Close Proximity Earth Orbiting Satellites
Matthew Ferringer	5/05	Satellite Constellation Design Optimization via Multiple-Objective Evolutionary Computation
Matthew Wissler	5/05	An Orbit Stability Analysis Method Applied to Trajectories for the Dawn Spacecraft Near Vesta
Jugo Igarashi	8/04	Optimal Continuous Thrust Orbit Transfers Using Evolutionary Algorithms
Phill-Sun Hur	5/04	Attitude Determination and Control of a Spinning Nanosatellite Using the Geomagnetic Field Data and Sun Sensors
Keith Akins	12/03	Dynamic Atmosphere Modeling for Precision Orbit Determination
Young Tae Ahn	8/02	Optimal Reconfiguration of Formation Flying Satellites
Anthony Faulds	5/02	Satellite Collision Analysis Using Genetic Algorithms, Parallel Processing and Stochastic Methods
Young Ha Kim	5/01	Optimal Rendezvous of Spacecraft Using Genetic Algorithms

B.S. Honors Students

Student Name	**Date**	**Thesis Title**
PattrickWittick	5/15	Attitude Dynamics Modeling for Docking Operations with Uncooperative Objects
Philip Chow	5/15	Long-Term Orbital Modeling for Objects in Geostationary Earth Orbit

Christopher Tombasco	5/15	Study of Feasibility of Asteroid-Centric Gravity Assists
Davide Conte	5/14	Survey of Earth-Mars Trajectories Using Lambert's Problem and Applications
Jessica Tramaglini	5/09	A Revisitation of the GPS Constellation Build Up Process
Phillip Ansell	12/08	A Comparison of Spacecraft Relative Motion Models about a Small Body
Donald Sampson (Eng. Sci. & Mech.)	12/04	Reconfigurable Control of Dynamical Systems to Compensate for Failure
Josh Geiple	12/03	Orbit Optimization Study for the Mars Microsatellite Atmospheric Research Constellation
Martin Ozimek	12/03	Mars Science Laboratory Abort Entry Study and Abort Guidance Development
Rebecca Thomas	12/03	Analysis of Differential Correction Accuracy in Low-Earth Orbit Satellites
William Chadwick	5/03	Utilization of Martian Moons for Precision Navigation for Mars Missions
David Navara	5/03	Formation Flying Satellite Reconfiguration During Build-up
Chris Scott	5/03	The Effects of Right Ascension on Orbit Lifetime in the Restricted Three Body Problem
Daniel Silianoff	12/02	Error Modeling for Space Debris Analysis
Chris Ranieri	12/01	The Analysis and Modeling of the Deployment of NASA's X-38 Parafoil
Sara Sheffler	12/01	Dynamic Atmospheric Effects on Satellite Orbits

PUBLICATIONS

Books:

1. Interplanetary Astrodynamics, D.B. Spencer and J.S. Parker, publisher TBD, 2017 (est).
2. The Aerospace Engineering Handbook, R. H. Bishop, D.B. Spencer, and W.A. Crossley, Editors, Taylor and Francis/CRC Press, 2016 (est).
3. Volume 114 of the Science and Technology Series, Results and Opportunities - The Decade of Utilization - 1st Annual ISS Research and Development Conference, co-editor with J.A. Robinson, 2013, 604 pages.

4. Astrodynamics 2001, Advances in the Astronautical Sciences, Volume 109, Parts I, II & III, co-editor with C.A. Seybold, A. Misra, and R. Lisowski, AAS Publication by Univelt, 2001, 2568 pages.
5. Astrodynamics 1997, Advances in the Astronautical Sciences, Volume 97, Parts I & II, co-editor with F.R. Hoots, B. Kaufman and P.J. Cefola, AAS Publication by Univelt, 1997, 2162 pages.

Chapters:

1. *The International Handbook of Space Technology* (Malcolm McDonald, editor), Springer Praxis Books, 2014
    - Chapter 1 - Introduction
2. *Space Mission Engineering: The New SMAD*, (James R. Wertz, David B. Everett and Jeffery J. Puschell, editors), Microcosm Press, 2011
    - Chapter 7 - Orbital Debris
3. *Space Modeling and Simulation: Roles and Applications Throughout the System Lifecycle*, Larry Rainey, editor, The Aerospace Press, 2004.
    - Chapter 12 (Orbital Mechanics and Mission Design),
    - Chapter 14 (Orbital Debris)

Journals:

1. Abraham, A.J., D.B. Spencer, and T.J. Hart, "Early Mission Design of Transfers to Halo Orbits via Particle Swarm Optimization", accepted for publication, *Journal of the Astronautical Sciences*, 2016.
2. Paul, M.V., D.B. Spencer, S.E. Lego, and J.P. Muncks, "The Penn State Lunar Lion: A University Mission to Explore the Moon", *Acta Astronautica*, Vol. 96, March-April 2014, pp. 65-77, 2014.
3. Williams, P.S., D.B. Spencer, and R.S. Erwin, "Coupling of Estimation and Sensor Tasking Applied to Satellite Tracking", *Journal of Guidance, Control, and Dynamics*, Vol. 36, No. 4 pp. 993-1007, DOI: 10.2514/1.59361, 2013.
4. Kim, J-S, J.V. Urbina, T.J. Kane and D.B. Spencer, "Improvement of TIE-GCM thermospheric density predictions via incorporation of helium data from NRLMSISE-00", *Journal of Atmospheric and Solar-Terrestrial Physics*, DOI 10.1016/j.jastp.2011.10.018, 2011.
5. Scott, C.J., and D.B. Spencer, "Calculating Transfer Families to Periodic Distant Retrograde Orbits Using Differential Correction," *Journal of Guidance, Control and Dynamics*, Vol. 33, No. 5, pp. 1592-1605, 2010.
6. Jordan, D.D., D.B. Spencer, T.W. Simpson, M.A. Yukish and G.M. Stump, "Optimal Continuous-Thrust Trajectories via Visual Trade Space Exploration," *The Journal of the Astronautical Sciences*, Vol. 57, No. 4, pp. 755–766, 2010.

7. Kang, B-N., D.B. Spencer, S. Tang and D.D. Jordan, "Optimal Periodic Cruise Trajectories via a Two Level Optimization Method", *Journal of Spacecraft and Rockets*, Vol. 47, No. 4, pp. 597-613, DOI: 10.2514/1.47365, 2010.
8. Benavides, J.C., and D.B. Spencer, "The four-body linear equations of planar relative motion", *Acta Astronautica*, Vol. 22, Issue 1, pp. 285-300, 2010.
9. Binz, C**.,** D**.**B. Spencer, D**.**A. Levin, and T**.**W. Simpson**, "**Designing for the Space Environment via Trade Space Exploration", *Journal of Spacecraft and Rockets*, Vol. 47, No. 6, pp. 1070-1073, 2010.
10. Scott, C.J., and D.B. Spencer, "Transfers to Sticky Distant Retrograde Orbits", *Journal of Guidance, Control and Dynamics*, Vol. 33, No. 6, pp. 1940-1946, 2010.
11. Ferringer, M.P., D.B. Spencer, D.B., and P. Reed, "Many-objective reconfiguration of operational satellite constellations with the Large-Cluster Epsilon Non-dominated Sorting Genetic Algorithm-II"**,** IEEE Congress on Evolutionary Computation, 2009; CEC '09. Publication Date: 18-21 May 2009, pp. 340-349, DOI: 10.1109/CEC.2009.4982967.
12. Kim, J. S., D. B. Spencer, T. J. Kane, and J. Urbina, "Thermospheric density model blending techniques: Bridging the gap between satellites and sounding rockets", *Radio Science*, 44, RS0A22, DOI:10.1029/2008RS004069, 2009.
13. Hur, P.-S., Melton, R.G., and Spencer, D.B., "Meeting Science Requirements for Attitude Determination and Control in a Low-Power, Spinning Nanosatellite, *Journal of Aerospace Engineering, Sciences and Applications*, Vol. 1, No. 1, pp. 25-33, 2008.
14. Mathew, A., and D.B. Spencer, "Incorporating Cooperative Learning Activities into Traditional Aerospace Engineering Curricula", Vol. 17, No. 3, pp. 25-38, *The Journal of Aviation/Aerospace Education and Research*, 2008.
15. Bessette, C.R., and D.B. Spencer, "Performance Comparison of Stochastic Search Algorithms on the Interplanetary Gravity Assist Trajectory Problem", *Journal of Spacecraft and Rockets*, Vol. 44, No. 3, pp. 722-724, 2007.
16. Kobrick, R.L, and D.B. Spencer, "Optimizing Trajectories for Suborbital Human Spaceflight", *Journal of Spacecraft and Rockets*, Vol. 44, No. 2, pp. 460-463, 2007.
17. Wissler, M.A., D.B. Spencer, and R.G. Melton, "Coast-Arc Orbit Stability During Spiral-Down Trajectories about Irregularly Shaped Body", *Journal of Spacecraft and Rockets*, Vol. 44, No. 1, pp. 254-263, 2007.
18. Scott, C.J., and D.B. Spencer, "Optimal Reconfiguration of Satellites in Formation", *Journal of Spacecraft and Rockets*, Vol. 44, No. 1, pp. 230-239, 2007.
19. Bilén, S.G., C.R. Philbrick, T.F. Wheeler, J.D. Mathews, R.G. Melton, and D.B. Spencer, "An Overview of Space Science and Engineering Education at Penn State", *Aerospace and Electronic Systems Magazine*, IEEE, Vol. 21, Issue 7, pp. S23-S27, 2006.
20. Ferringer, M.P. and D.B. Spencer, "Satellite Constellation Design Tradeoffs Using Multiple-Objective Evolutionary Computation", *Journal of Spacecraft and Rockets*, Vol. 43, No. 6, pp. 1404-1411, 2006.

21. Chadwick, W.J. III, D.B. Spencer, and R.G. Melton, "Geometric Visibility of Ground Sites for Beacon/Relays on the Martian Moons", *Journal of Spacecraft and Rockets*, Vol. 43, No. 1, pp. 228-230, 2006.
22. Spencer, D.B., R.G. Melton, and S.G. Chianese, "Selecting Projects for a Capstone Spacecraft Design Course from Real World Solicitations", *Journal of Aviation/Aerospace Education and Research*, Vol. 16, No. 1, pp. 27-40, 2006.
23. Igarashi, J. and D.B. Spencer, "Optimal Continuous Thrust Orbit Transfer Using Evolutionary Algorithms," *Journal of Guidance, Control and Dynamics*, Vol. 28, No. 3, pp. 547-549, 2005.
24. Yamato, H., and D.B. Spencer, "Orbit Transfer via Tube Jumping in Planar Restricted Problems of Four Bodies", *Journal of Spacecraft and Rockets*, Vol. 42, No. 2, pp. 321-328, 2005.
25. Yamato, H., and D.B. Spencer, "Transit-Orbit Search for Planar Restricted Three-Body Problems with Perturbation", *Journal of Guidance, Control and Dynamics*, Vol. 27, No. 6, pp. 1035-1045, 2004.
26. Faulds, A.L., and D.B. Spencer, "Satellite Close Approach Filtering Using Genetic Algorithms," *Journal of Spacecraft and Rockets*, Vol. 40, No. 2, pp. 248-252, 2003.
27. Kim, Y.H., and D.B. Spencer, "Optimal Orbital Rendezvous Using Genetic Algorithms, *Journal of Spacecraft and Rockets*, Vol. 39, No. 6, pp. 859-865, 2002.
28. Herman, A.E., and D.B. Spencer, "Optimal, Low-Thrust Earth-Orbit Transfers Using Higher-Order Collocation Methods", *Journal of Guidance, Control, and Dynamics*, Vol. 25, No. 1, pp. 40-47, 2002.
29. Cichan, T., R.G. Melton, and D.B. Spencer, "Control Laws for Minimum Orbital Changes - The Satellite Retrieval Problem", *Journal of Guidance, Control, and Dynamics*, Vol. 24, No. 5, pp. 1231-1233, 2001.
30. Spencer, D.B., K.K. Luu, W.S. Campbell, M.E. Sorge, A.B. Jenkin, "Orbital Debris Hazard Assessment Methodologies for Satellite Constellations", *Journal of Spacecraft and Rockets*, Vol. 38, No. 1, pp. 120-125, 2001.
31. Spencer, D.B., C.B. Hogge, W.S. Campbell, M.E. Sorge, and S.R. McWaters, "Some Technical Issues of an Optically-Focused Small Space Debris Tracking and Cataloguing System", *Space Debris* 2(3): 137-160, 2000.
32. Spencer, D.B., and R.D. Culp, "Designing Continuous-Thrust Low-Earth-Orbit to Geosynchronous-Earth-Orbit Transfers", *Journal of Spacecraft and Rockets*, Vol. 32, No. 6, pp. 1033-1038, 1995.
33. Chobotov, V.A., and D.B. Spencer, "Debris Evolution and Lifetime Following an Orbital Breakup", *Journal of Spacecraft and Rockets*, Vol. 28, No. 6, pp. 670-676, 1991.
34. Howell, K.C., and D.B. Spencer, "Periodic Orbits in the Restricted Four-Body Problem", *Acta Astronautica*, Vol. 13, No. 8, pp. 473-479, 1986.

Conference Proceedings and Presentations:

1. Conte, D., and D.B. Spencer, "Targeting the Martian Moons via Direct Insertion into Mars' Orbit", AAS 15-580, AAS/AIAA Astrodynamics Conference, Vail, CO, August 9-13, 2015.
2. Conte, D., M. Di Carlo, K. Ho, D.B. Spencer, and M. Vasile, "Earth-Mars Transfers Through Moon Distant Retrograde Orbit", AAS 15-588, AAS/AIAA Astrodynamics Conference, Vail, CO, August 9-13, 2015.
3. Goodyear, A.M.S., and D.B. Spencer, "Optimal Low-Thrust Geostationary Transfer Orbit Using Legendre-Gauss-Radau Collocation", AAS 15-766, AAS/AIAA Astrodynamics Conference, Vail, CO, August 9-13, 2015
4. Policelli, M.J., and D.B. Spencer, "Vertical Takeoff Vertical Landing Spacecraft Trajectory Optimization Via Direct Collocation and Nonlinear Programming", AAS 15-354, AAS/AIAA Space Flight Mechanics Meeting, Williamsburg, VA, January 11-15, 2015.
5. Reiter, J.A., A.K. Nicholas, and D.B. Spencer, "Optimization of Many-Revolution, Electric-Propulsion Trajectories with Engine Shutoff Constraints", AAS 15-237, AAS/AIAA Space Flight Mechanics Meeting, Williamsburg, VA, January 11-15, 2015.
6. Myers, P.L., and D.B. Spencer, "Application of a Multi-Objective Evolutionary Algorithm to the Spacecraft Stationkeeping Problem", IAC-14-C1.8.7, 65th International Astronautical Congress, Toronto, Canada, September 29-October 3, 2014.
7. DiGirolamo. L.J., A.H. Hoskins, K.A. Hacker and D.B. Spencer, "A Hybrid Motion Planning Algorithm for Safe and Efficient Close Proximity, Autonomous Spacecraft Missions", AIAA 2014-4130, AIAA/AAS Astrodynamics Specialists Conference, San Diego, CA, August 4-7. 2014.
8. Abraham, A.J., D.B. Spencer, and T.J. Hart, "Particle Swarm Optimization of 2-Manuver, Impulsive Transfers from LEO to Lagrange Point Orbits", 24th International Symposium on Space Flight Dynamics, Laurel, MD, May 2014.
9. Abraham, A.J., D.B. Spencer, and T.J. Hart, "Preliminary 2-D Optimization of Low-Thrust, Geocentric-to-Halo-Orbit Transfers via Particle Swarm Optimization", AAS 14-199, AAS/AIAA Space Flight Mechanics Meeting, Santa Fe, NM, January 26-31, 2014.
10. Hassa, C.L., D.B. Spencer, and S.G. Bilén, "Drag Coefficient Estimation Using Satellite Attitude and Orbit Data", AAS 14-349, AAS/AIAA Space Flight Mechanics Meeting, Santa Fe, NM, January 26-31, 2014.
11. Abraham, A.J., D.B. Spencer, and T.J. Hart. "Optimization of Preliminary Low-Thrust Trajectories From GEO-Energy Orbits to Earth-Moon, L1, Lagrange Point Orbits Using Particle Swarm Optimization." AAS 13-925, AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 2013.
12. Spencer, D.B. and B.S. Shank, "Preliminary Development of an Optimized Lambert Problem Solver for Targets in Elliptical Orbits", AAS 13-222, AAS/AIAA Space Flight Mechanics Meeting, Lihue, Hawaii, February 11-14, 2013.

13. McKennon-Kelly, R.E., P.S. Reed, D.B. Spencer and M.P. Ferringer, "Model Diagnostics and Dynamic Emulation: Enhancing the Understanding and Impact of Complex Models in Satellite Constellation Design", AAS 13-441 AAS/AIAA Space Flight Mechanics Meeting, Lihue, Hawaii, February 11-14, 2013.
14. Paul, M.V., and D.B. Spencer, "The Penn State Lunar Lion: A University Mission to Explore the Moon", IAC-12. B4.8.5, 63rd International Astronautical Congress, Naples, Italy, October 1-5, 2012.
15. Williams, P.S., D.B. Spencer, R.S. Erwin, K.J. DeMars, "The Effects of Uncertainty Estimation on Dynamic Sensor Tasking", AIAA 2012-4808, AIAA/AAS Astrodynamics Specialists Conference Minneapolis, MN, August 13-16, 2012.
16. Liang, K., D.B. Spencer, and J. Yuan, "Optimizing the Perilune of Lunar Landing Trajectories Using Dynamical Systems Theory", AIAA 2012-4430, AIAA/AAS Astrodynamics Specialists Conference, Minneapolis, MN, August 13-16, 2012.
17. Williams, P.S., D.B. Spencer and R.S. Erwin, "Utilizing Stability Metrics to Aid in Sensor Network Management Solutions for Satellite Tracking Problems", AAS 12–111, AAS/AIAA Space Flight Mechanics Meeting, Charleston, SC, January 29-February 2, 2012.
18. Williams, P.S., D.B. Spencer and R.S. Erwin "Comparison of Two Single-Step, Myopic Sensor Management Decision Processes Applied to Space Situational Awareness", AAS 12–112, AAS/AIAA Space Flight Mechanics Meeting, Charleston, SC, January 29-February 2, 2012.
19. Williams, P.S., D.B. Spencer, and R.S. Erwin, "Coupling of Nonlinear Estimation and Dynamic Sensor Tasking Applied to Space Situational Awareness", AAS 11-575, AAS/AIAA Astrodynamics Specialists Conference, July 31-August 4, 2011.
20. Polito, C.J. and D.B. Spencer, "The Probability of Asteroid-Earth Collisions by way of the Positional Uncertainty Ellipsoid", AAS 11-409, AAS/AIAA Astrodynamics Specialists Conference, July 31-August 4, 2011.
21. Benavides, J.C., and D.B. Spencer, "Analytic Solutions of the N-Body Problem", AAS 10–186, AAS/AIAA Spaceflight Mechanics Meeting, San Diego, CA, February 14-17, 2010.
22. Benavides, J.C., and D.B. Spencer, "Analytic Solutions of the Two-Body Problem", AAS 10–182, AAS/AIAA Spaceflight Mechanics Meeting, San Diego, CA, February 14-17, 2010.
23. Ahn, Y.T., and D.B. Spencer, "Preliminary Analysis of a Spacecraft Attitude Control System Using a Shifting Mass Distribution", IAC-09-C1.6.7, International Astronautical Congress, Daejeon, Republic of Korea, October 12-16, 2009.
24. Scott, C.J., and D.B. Spencer, Families of Transfer Trajectories to Distant Retrograde Orbits, Part 1: Transfers to Periodic Orbits, AAS 09-399, AAS/AIAA Astrodynamics Specialists Conference, Pittsburgh, PA, August 9-13, 2010.
25. Scott, C.J., and D.B. Spencer, Families of Transfer Trajectories to Distant Retrograde Orbits, Part 2: Single Impulse Transfers and Transfers to Quasi-periodic Orbits, AAS 09 –

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26. Spencer, D.B., Simpson, T.W., Yukish, M.A., and Stump, G., (2009) "Visual Steering Commands to Support Research in Trade Space Exploration", *NSF Engineering Research and Innovation Conference*, Honolulu, HI, June 22-25, 2009, National Science Foundation.
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