
CURRICULUM VITAE

Contact Information

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NASA Marshall Space Flight Center

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Citizenship: United States of America

Education

M.S. (1986) Physics, Vanderbilt University, Nashville, TN

B.A. (1984) Chemistry and Physics, Transylvania University, Lexington, KY

International Space University (1991), Space Business & Management, Toulouse, France

Employment

2014 – Present

Senior Technical Adviser, Advanced Concepts Office

NASA Marshall Space Flight Center, Huntsville, Alabama

2008 – 2014

Deputy Manager, Advanced Concepts Office

NASA Marshall Space Flight Center, Huntsville, Alabama

2005 - 2008

Manager, Science Programs and Projects Office

NASA Marshall Space Flight Center, Huntsville, Alabama

2002 – 2005

Manager, In-Space Propulsion Technology Project

NASA Marshall Space Flight Center, Huntsville, Alabama

2000 – 2002

Manager, In-Space Transportation Technology, Advanced Space Transportation

Program, NASA Marshall Space Flight Center, Huntsville, Alabama

1999 – 2000

Manager, Interstellar Propulsion Research Project, Advanced Space Transportation

Program, NASA Marshall Space Flight Center, Huntsville, Alabama

1996 – 1999

Study Manager for Space Tether Missions and Applications, Program Development Directorate, NASA Marshall Space Flight Center, Huntsville, Alabama

1990 – 1996

Study Manager for Space Science Advanced Concepts, Program Development Directorate, NASA Marshall Space Flight Center, Huntsville, Alabama

1986 – 1990

Research Physicist, General Research Corporation, Huntsville, Alabama

Space Flight Project Experience

2014 – Present

Principal Investigator, Near Earth Asteroid (NEA) Scout

2011 – Present

Co-Investigator, Deploytech/InflateSail Solar Sail Project

2007 – 2011

Co-Investigator, T-Rex Space Tether Experiment (with JAXA)

1997 - 2003

Principal Investigator, Propulsive Small Expendable Deployer System

Awards & Recognition

Watkins Prize (for science writing), 2015

NASA George C. Marshall Space Flight Center *Innovation Award*, 2015

Louisiana Wing Civil Air Patrol, *Frank G. Brewer Aerospace Award*, 2014

NASA Exceptional Technology Achievement Medal, 2013

Featured in the January 2013 issue of *National Geographic* magazine

LinkedIn “Top 5% Viewed Biographies for 2012”

NASA MSFC *Director’s Commendation*, 2011

Rotary Stellar Award Finalist, 2007

Vanderbilt University *Holladay Lecturer in Physics*, 2007

NASA Exceptional Achievement Medal, 2000

NASA Exceptional Achievement Medal, 1999

Professional of the Year: Huntsville Association of Technical Societies, 1998

Who’s Who in Science and Engineering, 1991 – present

MENSA

Technical Committees and Advisory Boards

2012 – Present

Advisory Board Member, Journal of the British Interplanetary Society

2012

Scientific Organizing Committee Member, 4th IAA Symposium on Searching for Life's Signatures

2011 - Present

Chair, Tennessee Valley Interstellar Workshop

2007 – 2011

Co-Chair, DIA-USA/SMDC-ORNL-NASA/MSEC Emerging and Enabling Technology Conference

2007 – Present

Scientific Committee Member, IAA Symposia on Realistic Near-Term Advanced Scientific Deep Space Missions

2004 – 2013

Co-Chair, Joint Army-Navy-NASA-Air Force (JANNAF) Spacecraft Propulsion Subcommittee

Professional Societies

2015 – Present

American Institute of Aeronautics and Astronautics

2015 – Present

American Astronautical Society

2013 – Present

World Future Society

2012 – Present

Science Fiction and Fantasy Writers of America

2012 – Present

British Interplanetary Society

2009 - Present

National Space Society

Inactive
Mensa

Patents

“A Laser-Triggered Fiber Optic Neutron Sensor,” 1994
“Combination Solar Sail and Electrodynamic Tether Propulsion System,” 2003
“Electrodynamic Tether,” 2006
“Foldable and Deployable Power Collection System,” 2015 (application pending)

Books Authored

Rescue Mode (2014 – hardcover; 2015 - paperback) with Ben Bova
Solar Sails, 2nd Edition (2014) with co-authors Giovanni Vulpetti and Gregory Matloff
Harvesting Space for a Greener Earth (2014) with Gregory Matloff and C Bangs
Sky Alert! – When Satellite Fail (2013)
Going Interstellar (2012) with Jack McDevitt
Back to the Moon (2010 – hardcover; 2011 - paperback) with co-author Travis Taylor
Paradise Regained: The Regreening of Planet Earth (2009) with co-authors Gregory Matloff and C Bangs
Solar Sails (2008) with co-authors Giovanni Vulpetti and Gregory Matloff (Honorable Mention - First Runner Up - in the 2008 Cosmology and Astronomy category of the 2008 PROSE Awards given by the Association of American Publishers)
Living off the Land in Space (2007) with co-authors Gregory Matloff and C Bangs

Published Popular Science Articles (with remuneration)

“Living Without Satellites,” Baen Books 2014
(http://www.baen.com/Living_Without_Satellites.asp)
“The Closest Extra-solar Planet to Earth: What’s Alpha Centauri Bb Like and How Can We Get There?” Baen Books 2013 (<http://www.baen.com/alphacentauri.asp>)
“Evidence of Things Unseen: Why Not dark matter?” Baen Books 2013
(<http://www.baen.com/darkmatter.asp>)
“Rediscovering the Universe,” Baen Books 2012
(<http://baen.com/RediscoveringTheUniverse.asp>)
“Rediscovering the Solar System,” Baen Books 2012
(<http://www.baen.com/SolarSystem.asp>)

“The Aliens Are Not Among Us,” Baen Books 2011 (<http://www.baen.com/Aliens.asp>)
Using Outer Space to Improve Life on Earth, Baen Books 2014
(http://www.baen.com/Using_Outer_Space.asp)

“The Size of It All,” Baen Books 2011 (<http://www.baen.com/SizeOfItAll.asp>)

Textbook Chapters

The International Handbook of Space Technology (2012), Chapter 21: Advanced Concepts
AIAA Aerospace Materials and Applications (2012), Chapter 13: Advanced Materials for In-Space Propulsion

Technical Consultant

Solis (movie) 2015 (in production)
Europa Report (movie) 2013 Theatrical Release
Lost In Space: The Movie 1998 Theatrical Release, New Line Cinemas
Citadel novel by John Ringo
Deep Six novel by Jack McDevitt
Cradle of Saturn novel by James P. Hogan
Deep Space Probes textbook by Gregory Matloff
Kicking the Sacred Cow popular science book by James P. Hogan
Hyperthought novel by M. M. Buckner

Selected Publications

Les Johnson, John Carr, Leo Fabisinski, and Tiffany Russell Lockett, "Lightweight Integrated Solar Array (LISA): Providing Higher Power to Small Spacecraft," AIAA Propulsion and Energy Conference 2015, Orlando, FL, July 2015.

Les Johnson, Julie Castillo-Rogez, Barbara Cohen and Leslie McNutt, "Solar Sail Propulsion for Interplanetary CubeSats," AIAA Propulsion and Energy Conference 2015, Orlando, FL, July 2015.

Les Johnson, Julie Castillo-Rogez, Barbara Cohen and Leslie McNutt, "NEA Scout and Lunar Flashlight: Two Near-Term Interplanetary Solar Sail Missions," 9th IAA Symposium on the Future of Space Exploration, Torino, Italy, July 2015.

Benjamin R. Beers, Les Johnson, et al, "Propulsion Technology Assessment: Science and Enabling Technologies to Explore the Interstellar Medium," AIAA Space 2015, Pasadena, CA, August 2015.

Les Johnson, "Advanced in Propellantless In-Space Propulsion Technologies," 38th AAS Guidance, Navigation and Control Conference, Breckenridge, CO, January 2015.

Tiffany Russell Lockett, Les Johnson, et al, "Advancements of the Lightweight Integrated Solar Array and Transceiver (LISA-T) Small Spacecraft System," 42nd IEEE Photovoltaic Specialists Conference, New Orleans, LA 2015.

Les Johnson, "Solar Sails: Sneaking Up on Interstellar Travel," to be published in The Journal of the British Interplanetary Society, 2015.

Sven Bilen, Les Johnson, et al, "Implementation Options for the PROPEL Electrodynamic Tether Demonstration Mission," 13th Spacecraft Charging Technology Conference, Pasadena, CA, June 2014.

Grover Swartzlander, Les Johnson, et al, "Rapid Small Package Delivery Service to Mars via Beamed Energy," international High Power Laser Ablation and Beamed Energy Propulsion (HPLA/BEP) Conference, Santa Fe, NM, April 2014.

Leslie McNutt, Les Johnson, et al, "Near-Earth Asteroid Scout," AIAA Space 2014, San Diego, CA 2014.

Sven Bilen, Les Johnson, et al, "Implementation Options for the PROPEL Electrodynamic Tether Demonstration Mission," Proceedings of the 2014 Spacecraft Charging Technology Conference, 2014.

Les Johnson, Dean Alhorn, et al, "Solar and Drag Sail Propulsion: From Theory to Mission Implementation," Proceedings of Space Propulsion 2014, Cologne, Germany, 2014.

Les Johnson, Leo Fabisinski, Karen Cunningham, and Stefanie Justice, "Lightweight Inflatable Solar Array: Providing a flexible, efficient solution to space power systems for small spacecraft, 32nd Annual Space Power Workshop, Manhattan Beach, CA, 2014.

Les Johnson, Grover Swartzlander, and Alexandra Artusio-Glimpse, "An Overview of Solar Sail Propulsion within NASA," The Third International Symposium on Solar Sailing, Glasgow, Scotland, 2013.

Colin McInnes, Les Johnson, et al, "Gossamer Roadmap Technology Reference Study for a Sub-L1 Space Weather Mission," The Third International Symposium on Solar Sailing, Glasgow, Scotland, 2013.

Bernd Dachwald, Les Johnson, et al, "Gossamer Roadmap Technology Reference Study for a Multiple NEO Rendezvous Mission," The Third International Symposium on Solar Sailing, Glasgow, Scotland, 2013.

Robert P. Hoyt, Les Johnson, et al, "PROPEL-TUG: Design of an Electrodynamic Tether Tug Demonstration." Joint Army-Navy-NASA-Air Force (JANNAF) 60th JPM / 9th MSS / 7th LPS / 6th SPS Joint Subcommittee Meeting, April 2013.

Les Johnson, Michael Meyer, Bryan Palaszewski, David Coote, Dan Goebel and Harold White, "Development priorities for in-space propulsion technologies," *Acta Astronautica*, Vol. 82, No. 2, February 2013.

Les Johnson, Roy Young, Nathan Barnes, Louis Friedman, Vaios Lappas and Colin McInnes, "Solar Sails: Technology and Demonstration Status," *International Journal of Aeronautical and Space Science*, Vol. 13, No. 4, 2012.

Sven Bilén, Les Johnson, et al, "The PROPEL Electrodynamic Tether Demonstration Mission," AIAA Space 2012 Conference, Pasadena, CA, September 11 – 13, 2012.

Les Johnson, et al, "Multiple NEO Rendezvous Using Solar Sail Propulsion," AIAA Global Space Exploration Conference, Washington, DC, May 22-24, 2012.

Michael Meyer, Les Johnson, Bryan Palaszewski, David Coote, Dan Goebel and Harold White, "Roadmap for In-Space Propulsion Technology," AAAF-ESA-CNES Space Propulsion 2012 Conference, Bordeaux, France, May 7 – 10, 2012.

Les Johnson, George Khazanov, Brian Gilchrist, Robert Hoyt, Nobie Stone and David Lee, "Space Tethers," *The Journal of Space Technology and Science*, Vol. 26, no.1, spring 2012.

Fujii, H.A., ... Johnson, L., et al, "Space Demonstration of Bare Electrodynamic Tape-Tether Technology on the Sounding Rocket S520-25," AISS-2011-6503, AIAA Guidance, Navigation, and Control Conference, Portland, Oregon, August 8-11, 2011.

Les Johnson, Michael Meyer, Bryan Palaszewski, David Coote, Dan Goebel and Harold White, "Technology Area Roadmap for In-Space Propulsion Technologies," Proceedings of the IAA Seventh Symposium on Realistic Near-Term Advanced Scientific Space Missions, Aosta, Italy, July 11-14, 2011.

Les Johnson, Roy Young, Edward Montgomery, and Dean Alhorn, "Status of Solar Sail Technology within NASA," *Advances in Space Research*, Volume 48 (2011), 1687 – 1694.

Les Johnson, Mark Whorton, et al, "NanoSail-D: A Solar Sail Demonstration Mission," *Acta Astronautica*, Vol. 68 (2011) 571-575.

Les Johnson and Mike Meyer, "Technology Roadmap for In-Space Propulsion Technologies," 2010 AFRL/JPL/NASA Advanced Space Propulsion Workshop, Colorado Springs, Colorado, November 2010.

Les Johnson, et al, "Solar Sail Propulsion Enabling New Capabilities for Heliophysics," 2011 Heliophysics Decadal Survey, arXiv: 1012.5250v1 [physics.space-ph], November 10, 2010.

Les Johnson, Roy Young, Edward Montgomery, and Dean Alhorn, "Status of Solar Sail Technology Within NASA," Second International Symposium on Solar Sailing, New York, New York, July 2010.

L. Johnson, H.A. Fujii, and J.R. Sanmartin, "Electrodynamic Propulsion System Tether Experiment (T-Rex)," May 2010 JANNAF Propulsion Meeting, Colorado Springs, CO.

Les Johnson and Dan Thomas, "A Comparison of Lunar Lander Options for Robotic Exploration of the Moon," *Journal of the British Interplanetary Society*, Vol. 62, No. 1, January 2009.

Hironori Fujii, Takeo Watanabe, Les Johnson, et al, "Sounding Rocket Experiment of Bare Electrodynamic Tether System," *Acta Astronautica*, Vol. 64 (2009), pp. 313-324

L. Johnson, H.A. Fujii, and J.R. Sanmartin, "Fortissimo: A Japanese Space Test of Bare Anode Tethers," Dec. 2008 JANNAF Propulsion Meeting, Orlando, Florida

Gregory L. Matloff, Roman Zezerashvili, Claudio Maccone, and Les Johnson, "The beryllium hollow-body solar sail: exploration of the Sun's gravitational focus and the inner Oort Cloud," 2008, physics, space-ph, arXiv:0809.3535

L. Johnson and Paul Gilbert, "NASA's Discovery Program: Moving toward the Edge (Of the Solar System)," *Journal of the British Interplanetary Society*, Vol. 61, No. 8, August 2008.

Gregory L. Matloff, Les Johnson, and Claudio Maccone, "Helios and Prometheus: A Solar/Nuclear Outer-Solar System Mission," *Journal of the British Interplanetary Society*, Vol. 60, No. 12, December 2007

Les Johnson, Roy M. Young, and Edward E. Montgomery, "Recent Advances in Solar Sail Propulsion Systems at NASA," *Acta Astronautica*, Vol. 61 (2007), 376-382

Johnson, Les; Young, Roy; and Montgomery, Edward E., Status of Solar Sail Propulsion: Moving Toward an Interstellar Probe," *New Trends in Astrodynamics and Applications III*, AIP Conf. Proc., February 7, 2007, Volume 886, pp. 207-214

Les Johnson, Bonnie James, Randy Baggett, and Edward E. Montgomery, "NASA's In-Space Propulsion Technology Program: A Step Toward Interstellar Exploration," 41st Symposium Realistic Near-Term Advanced Scientific Space Missions, Aosta, Italy, 4-6 Jul. 2005

Les Johnson, David Harris, Ann Trausch, Gregory L. Matloff, Travis Taylor, and Kathleen Cutting, "A Strategic Roadmap to Centauri," *Journal of the British Interplanetary Society*, Vol. 58, No. 9/10, September/October 2005

L. Johnson, D. Harris, A. Trausch, G.L. Matloff, T. Taylor, and K. Cutting, "In-Space Propulsion: Connectivity to In-Space Fabrication and Repair," NASA/TM-2005-214184, September 2005

Griffin, Brand; Thomas, Brent; Vaughan, Diane; Drake, Bret; Johnson, Les; Woodcock, Gordon, "A Comparison of Transportation Systems for Human Missions to Mars, 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit; Fort Lauderdale, FL; July 11-14, 2004

Les Johnson, Leslie Alexander, Randy Baggett, Joseph Bonometti, Melody Herrmann, Bonnie James, and Edward E. Montgomery, "NASA's In-Space Propulsion Technology Program: Overview and Status," 52nd Joint Army-Navy-NASA- Air Force Propulsion Meeting, 10-13 May, 2004

Johnson, Les; Alexander, Leslie; Baggett, Randy M; Bonometti, Joseph A; Herrmann, Melody; James, Bonnie F; Montgomery, Sandy E, "NASA In-Space Propulsion Technology Program: Overview and Update," 36th Annual Division for Planetary Science Meeting; 8-10 Nov. 2004

E.E. Montgomery, L. Johnson, R. Young, J. Presson, "Solar Sail Propulsion: A Simple, Propellantless, Rapidly Maturing Technology," American Astronomical Society, DPS meeting #36, #10.02; *Bulletin of the American Astronomical Society*, Vol. 36, 2004

L. Johnson and J. Robinson, "NASA's In-Space Propulsion Technology Program," American Astronomical Society, DPS meeting #36, #10.01; *Bulletin of the American Astronomical Society*, Vol. 36, 2004

E. Montgomery and C. Johnson, "The Development of Solar Sail Propulsion for NASA Science Missions," 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Palm Springs, California, Apr. 19-22, 2004

Les Johnson, Enrico Lorenzini, Brian Gilchrist, Nobie Stone, and Ken Wright, "Propulsive Small Expendable Deployer System (ProSEDS) Experiment: Mission Overview and Status," AIAA-2003-5094, 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Huntsville, Alabama, July 20-23, 2003

Woodcock, Gordon; Farris, Robert; Johnson, Les; Jones, Jonathan; Kos, Larry; Trausch, Ann, "Benefits of Nuclear Electric Propulsion for outer Planet Exploration," 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN; 7-10, July 2002

B. Eberle, B. Farris, L. Johnson, J. Jones, and L. Kos, "Selection and Prioritization of Advanced Propulsion Technologies for Future Space Missions," 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, Indiana, July 7-10, 2002

Les Johnson, B. Farris, B. Eberle, G. Woodcock, and B. Negast, "Integrated In-Space Transportation Plan," NASA/CR-2002-212050, October 2002

Johnson, Les, "Propulsion Technologies for Exploration of the Solar System and Beyond," Review of Scientific Instruments, Volume 373, No. 2, Pages 1079-1082, 2001

Johnson, Les, "Propellantless Propulsion Technologies for In-Space Transportation," 52nd IAF Conference, Toulouse, France; 1-5 Oct. 2001

Kirk Sorensen, Les Johnson, and Ken Welzyn, "Conceptual design issues of a Spinning Tether Orbital Transfer System (STOTS)," Aerospace Sciences Meeting and Exhibit, 38th, Reno, NV, Jan. 10-13, 2000

Johnson, L; Leifer, S. "Propulsion Options for Interstellar Exploration," AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, 36th, Huntsville, AL; 16-19 July 2000

Matloff, Gregory L., and Johnson, Les, "Magnetic surfing - Reformulation of Lenz's law and Applications to Spacecraft Propulsion," AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, 36th, Huntsville, AL, 16-19 July, 2000

Les Johnson, "The Tether Solution," IEEE Spectrum, Volume 37, Issue No. 7, Pages 38-43, July 2000

L. Johnson, R.D. Estes, E. Lorenzini, M. Martinez-Sanchez, and J. Sanmartin, "Propulsive Small Expendable Deployer System Experiment," Journal of Spacecraft and Rockets, 2000, vol. 37, no. 2

E. C. Lorenzini; M. L. Cosmo; M. Kaiser; M. E. Bangham; D. J. Vonderwell; L. Johnson, "Mission Analysis of Spinning Systems for Transfers from Low Orbits to Geostationary," *Journal of Spacecraft and Rockets*, 2000 vol.37 no.2 (165-172)

R. D. Estes; E. C. Lorenzini; J. Sanmartin; M. Martinez-Sanchez; C. L. Johnson; and I. E. Vas, "Bare Tethers for Electrodynamic Spacecraft Propulsion," *Journal of Spacecraft and Rockets* 2000, vol.37 no.2 (205-211)

C. Talley, J. Moore, D. Gallagher, and L. Johnson, "Propulsion and Power from a Rotating Electrodynamic Tether at Jupiter," 38th Aerospace Sciences Meeting and Exhibit, January 2000.

L. Johnson, B. Gilchrist, R. D. Estes and E. Lorenzini, "Overview of Future NASA Tether Applications," *Advances in Space Research*, 1999, Volume 24, Issue 8, p. 1055-1063

B. Gilchrist, S. Bilen, and L. Johnson, "Space electrodynamic tether propulsion technology – System considerations and future plans," 35th Joint Propulsion Conference, June, 1999.

Santangelo, Andrew; Johnson, Les; Gilchrist, Brian; Hoffman, John; Lorenzini, Enrico; Estes, Robert, "Advancing electrodynamic tethers to commercially viable systems - STEP-AIRSEDS," NASA/JPL/MSFC/AIAA Annual Advanced Space Propulsion Workshop, 10th, Huntsville, AL; 5-8 Apr. 1999

Johnson, Les; Estes, Robert D; Lorenzini, Enrico; Martinez-Sanchez, Manuel; Sanmartin, Juan; Vas, Irwin, "Electrodynamic Tethers for Spacecraft Propulsion," AIAA, Aerospace Sciences Meeting & Exhibit, 36th, Reno, NV; 12-15 Jan. 1998

Johnson, Les; Ballance, Judy; Gilchrist, Brian; Estes, Robert D; Lorenzini, Enrico, "Propulsive Small Expendable Deployer System (ProSEDS) Space Experiment," AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, 34th, Cleveland, OH; 13-15 July 1998

Johnson, L; Herrmann, M., "International Space Station Electrodynamic Tether Reboost Study," 1998, NASA Technical Memorandum 1998-208538

Johnson, L., Gilchrist, B., Estes, R. D., Lorenzini, E, Martinez-Sanchez, M., and Sanmartin, J., "Electrodynamic Tether Propulsion for Spacecraft and Upper Stages, July 1998 JANNAF Propulsion Meeting, Volume 1, pages 253-262

Gallagher, D L; Johnson, L; Moore, J; Bagenal, F, "Electrodynamic Tether Propulsion and Power Generation at Jupiter," NASA Technical Publication 1998-208475

Johnson, L., and Herrmann, M., "Tether-Based Investigation of the Ionosphere and Lower Thermosphere Concept Definition Study Report, NASA Technical Memorandum, 1997-108843

Herrmann, M., and Johnson, L., "A Upper Atmospheric Tether Mission," AIAA, Space Programs and Technologies Conference, Huntsville, AL, September 1996

Armstrong, T.P, and Johnson, L., "Magnetosphere Imager Science Definition Team Interim Report," NASA Technical Memorandum, 1995

Johnson, L., and Herrmann, M., "Inner Magnetosphere Imager mission: a new window on the plasma universe," *Optical Engineering* 33(02), 329-334, February 1994

Johnson, Les and Herrmann, Melody, "Imaging the Earth's magnetosphere from space - The inner magnetosphere imager mission," *Instrumentation for Magnetospheric Imagery II; Proceedings of the Conference, San Diego, CA; UNITED STATES; 14 July 1993.* pp. 2-10. 1993

Herrmann, Melody, and Johnson, Les, "Spacecraft design considerations for an inner-magnetosphere imager mission," *Proceedings of SPIE -- Volume 1744 Instrumentation for Magnetospheric Imagery, June 1992,* pp. 2-12

Johnson, Charles L., and Brown, Norman S., "Near-term SEI science missions utilizing an evolutionary lunar transportation system," *IAF, International Astronautical Congress, 43rd, Washington, Aug. 28-Sept. 5, 1992*

Charles L. Johnson, Kurtis L. Dietz, T. W. Armstrong, and B. L. Colborn, "Mitigation of Adverse Environmental Effects on Lunar-Based Astronomical Instruments," *Space '92, Proceedings of the Third International Conference held in Denver, Colorado, May 31-June 4, 1992*

Johnson, Charles L., and Dietz, Kurtis L., "Effects of the lunar environment on optical telescopes and instruments," *Proceedings of SPIE -- Volume 1494, Space Astronomical Telescopes and Instruments, September 1991,* pp. 208-218