

Robert William Moses, PhD

Aerospace Technologist, National Aeronautics and Space Administration (NASA)

1989-2022

2014-Present: organized, led, and participated in a variety of NASA Langley Research Center Blue Sky Workshops and Follow-on Studies to explore solution spaces to resolve grand challenges facing human missions to Mars; these studies include In Situ Resource Utilization, Reusable Landers and Mars Ascent Vehicles, Reusable Rockets and other Mission Elements, Galactic Cosmic Ray (GCR) Radiation Shielding, Human Health Issues and Mitigation Strategies involving engineering solutions such as Fast Transits to/from Mars, and other topics affecting Mars Sustainability; mentor PhD students within the NASA Space Technology Research Fellowship (NSTRF) Program conducting research in a variety of aerospace concepts; mentor early career employees through several NASA Programs such as GROW (Gaining Rare Opportunities through Wisdom) that encourages employees to move beyond their comfort zone while working large team projects; creator of the GROW Topic “Becoming a Multi-Planet Species” that increases awareness of how their particular skills and chosen profession is relevant to humanity’s greatest exploration goal; collaborate on research at the Aldrin Space Institute and the National Institute of Aerospace; currently serves on NASA’s Space Technology Mission Directorate’s In Situ Resource Utilization Systems Capabilities Leadership Team and serves as Chair of its multi-Center ISRU Construction Integrated Steering Group, aimed at establishing construction requirements for defining functional capabilities and mission scenarios leading to technology development for human missions to the Moon and Mars; continue to serve on the Steering Committee for the Moon to Mars Ice Challenge, a University Competition hosted at LaRC each summer; serves on the organizing and planning committees for the Explore Mars’ Achievable Mars Workshops and the Humans to Mars Summits; serves as an Small Business Innovative Research (SBIR) Subtopic Lead for ISRU, providing critical reviews of proposals, especially in the ISRU Functional Capabilities In Situ Construction, In Situ Manufacturing, and In Situ Energy; served as a competition judge for NASA’s Breakthrough, Innovative and Game-changing (BIG) Idea Challenge that engages universities in engineering design to develop space exploration concepts for the Moon to Mars mission; serves as on the NASA Centennial Challenge Ideation Committee for creating competition projects for the Moon and Mars; principal investigator of a NASA Innovative Advanced Concepts (NIAC) Phase 1 project “Advanced Aerocapture System for Enabling Faster Larger Planetary Science & Human Exploration Missions”; served as the Principal Investigator of the Lunar Safe Haven Study funded by NASA’s Game Changing Development Program to explore options to emplace GCR radiation shielding for crewed long stays on the Moon. Co-chair, NASA Space Technology Graduate Research Opportunities (NSTGRO), TA 7, Human Exploration Destination Systems Technology Area, to review and select proposals for graduate fellowships among a diverse group of students and universities. Principal Investigator of “Architectures to Enable Commercial Remediation of LEO Debris”, a study with Tethers Unlimited, overview presented at the 2022 Space Disposal and Debris Mitigation Conference hosted by LRA Institute.

2010-2013: participated in a variety of studies of radiation shielding concepts for solar particle events to mitigate their impacts on crew and equipment; participated several studies to explore options for aerocapture and aerobraking at Uranus, Neptune, and Mars that included replacing ablative Thermal Protection Systems with Durable Thermal Structures and its reusability.

2006-2009: Exploration Engineering Branch renamed to Atmospheric Flight & Entry Systems Branch; bid and proposal work converted to directed research as the Constellation Program geared up; assigned to the Constellation Program Flight Test Office to define flight test requirements and derive flight test manifests for buying down risks of the Shuttle replacement transportation system called Ares I; co-authored the Constellation Program Integrated Flight Test Strategy which identified flight opportunities with assigned objectives for completing all requirements; monitored the Ares I-X Flight Vehicle Development through its flight test in October 2009; shortly thereafter, the Constellation Program was cancelled.

2004-2005: Exploration Engineering Branch; conducted engineering analysis and lead bid and proposal writing activities resulting in winning NASA projects to analyze in space assembly concepts and begin development of a ballute design for returning crew to Earth from the Moon.

1997-2003: Aeroelasticity Branch; assisted the Air Force Research Laboratory to organize an international team through The Technical Cooperation Program (TTCP) to combine the talents and resources of the US, Australia, and Canada for focused research on buffet load alleviation concepts via wind-tunnel and ground test investigations of twin-tail fighters; this award-winning investigation was spread across two test demonstration phases to allow infusion of new technology; separate from the international program, worked with jet fighter defense contractors and the Air Force Research Laboratory to redesign the F-22 and design all 3 variants of the F-35, transferring all technology developed in buffet load alleviation to those companies. Concurrently, participated in the development of a new Mars airplane prototype by leading the wind-tunnel investigation of the Mars ARES (Aerial Regional-scale Environmental Survey) Airplane Wing Deployment Test in the wind tunnel while also developing an advanced Mars Entry concept called Regenerative Aerobraking. (This latter work allowed my swift transfer to Space Exploration work following the completion and commercial transfer of my Aeronautics research).

1993-1997: Aeroelasticity Branch, Structures and Materials Directorate; PhD research while supporting numerous wind-tunnel tests of aeroelastic responses of many aircraft designs from subsonic through transonic to supersonic speeds; designed control laws and implemented active control approaches to mitigate unwanted aeroelastic responses and to demonstrate active load alleviation concepts

1991-1993: Stanford University, full-time student, MS & PhD Programs while still a member of the Structures and Thermal Analysis Branch; during school breaks, worked with Dr. Robert Whalen at NASA Ames Research Center to construct finite element models of a Lower Body Negative Pressure Chamber concept being designed for flight demonstrations on NASA's KSC-135 Aircraft

1989-1991: Structures and Thermal Analysis Branch, Systems Engineering Directorate: Structural & Systems Engineer on STS-37 Shuttle Mission Hardware Development called CETA (Crew and Equipment Translation Aid) and an Earth-Observing Satellite called SAFIRE (Spectroscopy of the Atmosphere using Far InfraRed Emission) and SAGE (Stratospheric Aerosol Gastropheric Experiment) instruments

TEACHING & MENTORING EXPERIENCE

2000 – Present: Guest Lecturer for various courses at the National Institute of Aerospace and university colloquiums

2018-2019: Coauthor and lecturer, graduate level 2-semester course, Small Satellite Design Course broadcasted from the National Institute of Aerospace to multiple universities including Florida Institute of Technology

2017- Present: NASA HUNCH (High schools United with NASA to Create Hardware), a STEM outreach program to bring students new educational experiences via design and prototype projects for producing hardware items for the International Space Station and for repairing rovers on the Lunar Surface

2013- Present: NASA Space Technology Research Fellowship Program, a fully funded competitively competed PhD Program. Two Fellows developing new tools and methodologies for advanced concepts related to Entry, Descent, and Landing on other planets

2009- Present: New Horizons Governor's School Program whereby high school seniors select a research topic for further study resulting in a small individual project and a final report

2000 - Present: NASA Internship and Cooperative Engineering Programs, mostly undergraduate students working on multidisciplinary teams to create new aerospace systems concepts tied to their chosen university degree programs of study

AWARDS

International Group Achievement Award, Subcommittee on Non-Atomic Military Research and Development (NAMRAD), The Technical Cooperation Program (TTCP), Successful Completion of a F/A-18 full-scale Buffet Load Alleviation Ground Test Program to demonstrate the application of first generation state-of-the-art planar active piezoelectric actuators to suppress unwanted aircraft structural responses to random aerodynamic buffet loads. International Team consisted of experts from USA, Australia, and Canada; September 2000.

NASA Exceptional Achievement Medal, July 2001, Exceptional Achievement in Leading NASA's Successful Research in Active Buffet Load Alleviation of Twin-Tail Fighter Aircraft for developing new technologies for extending operational fatigue life.

International Group Achievement Award, Subcommittee on Non-Atomic Military Research and Development (NAMRAD), The Technical Cooperation Program (TTCP), Successful Completion of a F/A-18 full-scale Buffet Load Alleviation Ground Test Program to demonstrate the application of advanced macro-fiber directional in-plane active piezoelectric actuators developed by NASA Langley Research Center to suppress unwanted aircraft structural responses to random aerodynamic buffet loads. International Team consisted of experts from USA, Australia, and Canada; July 2007.

Numerous Individual Achievement, Group Achievement, and Team Awards.

PATENTS, TECH BRIEFS, TECHNOLOGY TRANSFERS

Moses, Robert W. (Inventor), Fox, Christopher L. (Inventor), Fox, Melanie L. (Inventor), Chattin, Richard L. (Inventor), Shams, Qamar A. (Inventor), and Fox, Robert L. (Inventor), "System and Method for Monitoring Piezoelectric Material Performance," US Patent-7,262,543 B2, 28 August 2007.

Moses, Robert W., Fox, Robert L., Dimery, Archie D., Bryant, Robert G., and Shams, Qamar, "Software for Testing Electroactive Structural Components," NASA Tech Briefs, September 2003.

Moses, Robert W., "Blended Buffet-Load-Alleviation System for Fighter Airplane," NASA Tech Briefs, February 2005.

Chattin, Richard L., Fox, Robert Lee, Moses, Robert W., and Shams, Qamar A., "LC Circuits for Diagnosing Embedded Piezoelectric Devices," NASA Technical Briefs, June 2005.

Moses, Robert W. and Pototzky, Anthony S., "Predicting Tail Buffet Loads of a Fighter Airplane," NASA Tech Briefs, January 2006.

LAR-15649 Vertical Tail Buffet (Load) Alleviation Using Pressure Feedback To Actively Control The Rudder

LAR-15648 Vertical Tail Buffeting (response) Alleviation Using An Actively Controlled Rudder

LAR-15647 Vertical Tail Buffeting (Response) Alleviation Using Actively Controlled Piezoelectric Actuators

LAR-15730 Airfoil Shape Control For Aerodynamic Tailoring Using Thin-Layer Composite-Unimorph Ferroelectric Driver And Sensor (THUNDER) Actuators

LAR-15729 Carriage For Holding Thin-Layer Composite-Unimorph Piezoelectric Driver And Sensor (THUNDER) Actuator In Place During Actuation Of Surface Of Airfoil

LAR-15873 Stable Positioning Of Shape Memory Alloy Tendons In Seamless Control Surfaces

LAR-16041 Interdigitated SMA Fiber Composite

LAR-16046 Hybrid Interdigitated Shape Memory Alloy (SMA) Fiber Composite For Out-of-Plane Actuation/Displacements (e.g., Airfoil Shaping)

LAR-16162 Layered Macro Fiber Actuator For Buffet Loads Alleviation And Suppression Of Vibrating Thick Skin

LAR-16185 Stacked Longitudinal Piezoelectric Sensor And Actuator

LAR-16161 Method Of Fabricating Electro-Active Structure With Internal Electrodes For Actuation And Sensing

LAR-16292 ""Responsive Skin"" For Controlling Structural Motion (i.e., Morphing Aerospace Vehicle Wings, Tails, And Other Primary And Secondary Structure)

LAR-16368 In-Substrate Sensor Within Actuator Package For Collocated Control, Health Monitoring, And Performance Verifications

LAR-16312 Multilayer Strain Gage Hysteresis Data Acquisition System

LAR-16370 Directional Electro-Active Inplane Actuator Alignment For Vibration Control Of F/A-18 Fin

LAR-16375 Blended Buffet Load Alleviation System For High Performance Aircraft

LAR-16369 Multilayer Directional Electro-Active Actuator And Sensor (MDEAS)

LAR-16507 Regenerative Aerobraking Using Thermal Diodes, Super Tubes, And Other Relevant Energy Capturing/Storage/Usage Processes And Components

LAR-16515 An Analysis Method To Predict Tail Buffet Loads Of Fighter Aircraft Using Pressure Spectra Scaled From Wind-Tunnel Data

LAR-16541 Electrode Alignment Tray And Holder For Poling And Diagnosing Entire Sheet Of Piezoelectric (MFC) Actuators

LAR-16530 High Yield Macro-Fiber Composite Manufacturing Process

LAR-16542 Scalable Modular Signal Relay Box For Poling And Diagnosing Multiple Actuators Simultaneously

LAR-16534 Regenerative Aerobraking Using External MagnetoHydroDynamics (MHD) For Energy Harvesting, Drag Control, And Vehicle Stability And Control

LAR-16537 Plasma Structures (PS) For Harvesting Energy From Orbit Or Flyby Of Atmospheres, Van Allen Belts, Or Other Plasma Sources

LAR-16511 Flextronic Actuator

LAR-16546 Piezo Actuator Diagnostic And Performance Verification System

LAR-16549 Inductor (L)-Capacitor (C) (aka, LC) Sensor Circuit For Piezo Material Monitoring

LAR-16552 Electrically-Mechanically Unbalanced IDE Multi-Morph Driver And Sensor

LAR-16551 Tangential Field Device

LAR-16548 Directional Doming IDE BIMORPH Driver And Sensor

LAR-16547 Directional Doming IDE UNIMORPH Driver And Sensor

LAR-16901 Layered Socket Graphical Architecture For 3-D Display Of Resource Deployment And Facility Utilization For Project And Resource Management

LAR-16560 Active IDE Reed Valve

LAR-16910 In Situ Oxygen Harvesting During Planetary Entry

LAR-16275 Regenerative Aerobraking Using Carbon Nano Tube (CNT) Flywheel And Other Relevant Energy Capturing/Storage/Usage Processes And Components

LAR-17963 Low Energy Nuclear Reaction (LENR) Cathode Pipe(s)

LAR-18145 Method of Initiating and Sustaining Low Energy Nuclear Reactions (LENR)

LAR-19423 Cupola Restraint for the International Space Station (ISS)

LAR-19538 Bessel Tube for Driving Gaseous Molecules and Nanoparticles into Linear Motion

LAR-19575 Platform analysis tool for in-space assembly capability demonstrations

LAR-19610 Deployable Micro-spectrometer Bullets

LAR-19649 Cooling Method for Nuclear Thermionic Avalanche Cell (NTAC) – Provisional Filed April 2020

LAR-19656 Radiation Shielding for Extra-Vehicular Activities (EVAs) and other Surface Operations

LAR-19672 Modified Rodriguez Well for Planetary Water Extraction

LAR-19813 Isotope Handling Method for NTAC and Similar “Nuclear Battery” Devices to Enable On/Off Switch, Standby, Throttling, and Maintenance Modes – Pending

LAR-19833 Beta Particle Driven Electron Avalanche for NTAC – Pending

LAR-19848 Nuclear Fission Reactor with Nuclear Thermionic Avalanche Cell (NTAC) – Pending
Surface Flashover And Material Texturing For Multiplying And Collecting Electrons For Nuclear Thermionic Avalanche Cells And Nuclear Battery Devices – Pending

LAR-19916-1 Integrated Dissociation Processing of Carbon Dioxide

LAR-19976-1 NTAC Augmented Nuclear Electric Propulsion and/or Nuclear Thermal Propulsion – Pending

LAR-20033-1 Method for Lift Augmentation of Atmospheric Entry Vehicles During Aerocapture and Entry, Descent, and Landing Maneuvers – Pending

LAR-20037-1 Electrode Design for Lift Augmentation and Power Generation of Atmospheric Entry Vehicles During Aerocapture and Entry, Descent, and Landing Maneuvers - Pending

LAR-20039-1 Reverse-Ephemeris Lunar Navigation System for Long-Distance Route Determination – Pending

LAR-20066-1 Ferrohydrodynamic (FHD) Droplet Radiator using Magnetic Liquid Metal (MLM) - Pending

LAR-20067-1 Enhanced Electrodynamic Tether (EDT) for Achieving Higher-Inclination Higher-Altitude Orbits with Increased Agility – Pending

ARTICLES

Bushnell, D. M. and Moses, R. W., “Fresh Thinking About Mars,” *Aerospace America*, March 2016, pp. 34-39.

Bushnell, D. M., and Moses, R. W., “Enabling Electric Aircraft,” *Professional Pilot*, October 2018.

BOOKS & NOVELS

Handbook of Lunar Base Design & Development, Springer, expected in 2020, Andrew Aldrin / Peter Eckart (Editors), Robert Moses, Editor & Author, Section 9: “Human Exploration beyond the Moon”.

Title Withheld, Sci Fi Novel on Moon to Mars, expected in 2021. Complete trilogy expected in 2022.

Title Withheld, Sci Fi Novel on Becoming Multiplanet Species, expected in 2021.

Title Withheld, Nonfictional Novel based on the life stories of a Korean family as it struggled to survive in their war-torn hometown, expected in 2021.

Title Withheld, Nonfictional Novel based on the life stories of an Australia family to find its footing following WW II, expected in 2021.

INVITED TALKS & KEYNOTE LECTURES

“Footsteps to Mars: Before the First Boot Prints on Mars – Some Critical Steps Before Sending Astronauts,” The American Astronautical Society and the American Astronomical Society inaugurated a new “Future in Space” series of Google Hangouts, January 5, 2017

“First Foothold on Mars - Sustainable Human Bases/Colonies on Mars,” (Interviewed by Andrew Luck-Baker, Senior Producer, BBC Radio Science Unit, BBC World Service, 9 February 2017

“Colonizing Mars,” Interviewed by Jonathan Brunert, *FutureProofing*, Edition on *Space Colonisation*, BBC Radio Science Unit, BBC World Service, 2 March 2017

“Sustaining Human Presence on Mars Using ISRU and a Reusable Lander,” The William E. Boeing Department of Aeronautics & Astronautics Chair’s Distinguished Seminar Series, University of Washington, Seattle, WA, 19 March 2018

“Humans on Mars Sustainability”, MODSIM World, Norfolk, VA, 26 April 2018

“Sustaining Human Presence on Mars Using ISRU and a Reusable Lander,” Guest Lecturer, Australian Centre for Space Engineering Research (ACSER), University of New South Wales, Sydney, New South Wales, Australia, 17 October 2018

“Sustaining Human Presence on Mars Using ISRU and a Reusable Lander,” The 3rd International Workshop on Active Materials and Soft Mechatronics (AMSD 2018), KAIST, Daejeon, South Korea, 25 October 2018

“Autonomous Surface Site Establishment to Ensure Safe Crew Arrival and Operations: Implications for In Situ Construction,” INHA Institute of Space Science and Technology, INHA University, Incheon, South Korea, December 2018

“Autonomous Surface Site Establishment to Ensure Safe Crew Arrival and Operations: Implications for Terrestrial Mining in Remote Locations,” Oz Minerals Mining Innovation Workshop #1, Adelaide, South Australia, Australia, May 2019

“Starting a Discussion on Safety, NASA’s Way,” Oz Minerals Mining Innovation Workshop #2, Adelaide, South Australia, Australia, September 2019

“Starting a Discussion on Safety, NASA’s Way,” BHP, Adelaide, South Australia, Australia, September 2019

PUBLICATIONS

Moses, Robert W. and Averill, Robert D., “Conceptual design and structural analysis of the spectroscopy of the atmosphere using far infrared emission (SAFIRE) instrument,” NASA Technical Report, NASA-TM-104144, April 1992.

Pinkerton, Jennifer L., McGowan, Anna-Maria R., Moses, Robert W., Scott, Robert C. and Heeg, Jennifer, “Controlled Aeroelastic Response and Airfoil Shaping Using Adaptive Materials and Integrated Systems,” SPIE's 1996 Symposium on Smart Structures and Integrated Systems; 26-29 February 1996; San Diego, CA; United States

Moses, Robert W. and Pendleton, Ed, “A Comparison of Pressure Measurements Between a Full-Scale and a 1/16-Scale F/A-18 Twin Tail During Buffet,” 83rd Structures and Materials Panel Meeting, AGARD-R-815, Loads and Requirements for Military Aircraft, 2-6 September 1996, Florence, Italy

Moses, Robert W., “Vertical Tail Buffeting Alleviation Using Piezoelectric Actuators: Some Results of the Actively Controlled Response of Buffet-Affected Tails (ACROBAT) Program,” SPIE's 4th Annual Symposium on Smart Structures and Materials, Industrial and Commercial Applications of Smart Structures Technologies; SPIE Volume 3044, pp. 87-98, 4-6 March 1997; San Diego, CA; United States

Pinkerton, Jennifer L. and Moses, Robert W., “A Feasibility Study to Control Airfoil Shape Using THUNDER (thin-layer composite-unimorph ferroelectric driver and sensor),” NASA Technical Report, NASA-TM-4767, November 1997.

Moses, Robert W. and Ashley, Holt, “Spatial Characteristics of the Unsteady Differential Pressures on 16 percent F/A-18 Vertical Tails,” AIAA 98-0519, 36th Aerospace Sciences Meeting and Exhibit; 12-15 January 1998; Reno, NV; United States

McGowan, Anna-Maria Rivas, Wilkie, W. Keats, Moses, Robert W., Lake, Renee C., Florance, Jennifer Pinkerton, Wieseman, Carol D., Reaves, Mercedes C., Taleghani, Barmac K., Mirick, Paul H., and Wilbur, Matthew L., “Aeroservoelastic and Structural Dynamics Research on Smart Structures Conducted at NASA Langley Research Center,” Proceedings of the Smart Structures and Materials: Industrial and Commercial Applications Conference, p. 188-201, SPIE No. 3326-21, March 1998, San Diego, CA, United States

Moses, Robert W. and Shah, Gautam H., “Spatial Characteristics of F/A-18 Vertical Tail Buffet Pressures Measured in Flight,” 39 th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, AIAA 98-1956, 20-23 April 1998, Long Beach, California, United States

Moses, Robert W., “Active Vertical Tail Buffeting Alleviation on an F/A-18 Model in a Wind Tunnel,” The Second Joint NASA/FAA/DoD Conference on Aging Aircraft; Proceedings of a Conference sponsored by the National Aeronautics and Space Administration, Federal Aviation Administration, U.S. Air Force Materiel Command, U.S. Naval Air Warfare Center, and U.S. Army Research Laboratory, NASA/CP-1999-208982/PT2, p. 821-830, 31 August – 3 September 1998, Williamsburg, VA, United States

Ryall, T. G., Moses, R. W., Hopkins, M. A., Henderson, D., Zimcik, D. G., and Nitzsche, F., "Buffet Load Alleviation," Australasian Congress on Applied Mechanics. & Australian Defence Force Academy. & National Committee on Applied Mechanics, Second Australasian Congress on Applied Mechanics ACAM February 1999, School of Aerospace and Mechanical Engineering, University of New South Wales (UNSW), Australian Defence Force Academy (ADFA), Canberra, Australia

Moses, Robert W., "Contributions to Active Buffeting Alleviation Programs by the NASA Langley Research Center," Paper No. AIAA-99-1318, 40th Structures, Structural Dynamics, and Materials Conference and Exhibit, 12-15 April 1999, St. Louis, MO, United States

Moses, Robert W. and Shah, Gautam H., "Correlation of Fin Buffet Pressures on an F/A-18 with Scaled Wind-Tunnel Measurements," "CEAS/AIAA/ICASE/NASA Langley International Forum on Aeroelasticity and Structural Dynamics 1999"; p. 615-626; Pt. 2; NASA/CP-1999-209136/PT2, June 1999, Paper presented 22-25 June 1999, Williamsburg, VA, United States

Moses, Robert W., "NASA Langley Research Center's Contributions to International Active Buffeting Alleviation Programs," Research and Technology Organization, Meeting Proceedings RTO-MP-36, "Structural Aspects of Flexible Aircraft Control," Papers presented at the Specialists' Meeting of the RTO Applied Vehicle Technology Panel (AVT), p. 15-1 – 15-9, 18-20 October 1999, Ottawa, Canada

Moses, Robert W. and Huttshell, Lawrence, "Fin Buffeting Features of an Early F-22 Model," 41st AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials; AIAA-2000-1695, 3-6 April 2000; Atlanta, GA; United States

Edwards, John W., Schuster, David M., Spain, Charles V., Keller, Donald F., and Moses, Robert W., "MAVRIC Flutter Model Transonic Limit Cycle Oscillation Test," 42nd AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference; 16-19 April 2001; Seattle, WA; United States

Burnham, Jay K., Pitt, Dale M., White, Edward V., Henderson, Douglas A., and Moses, Robert W., "An Advanced Buffet Load Alleviation System," 42nd Structures, Structural Dynamics, and Materials Conference; 16-20 April 2001; Seattle, WA; United States

Moses, Robert W., Wieseman, Carol D., Bent, Aaron A. and Pizzochero, Alessandro E., "Evaluation of New Actuators in a Buffet Loads Environment," SPIE--The International Society for Optical Engineering, Proceedings of the SPIE, Volume 4332, Smart Materials and Materials 2001: Industrial and Commercial Applications of Smart Structures Technologies, p. 10-21, 14 June 2001, Newport Beach, CA, United States

Sheta, Essam F., Moses, Robert W., Huttshell, Lawrence J., and Harrand, Vincent J., "Active Control of F/A-18 Vertical Tail Buffeting using Piezoelectric Actuators," 44th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference; 16-19 April 2003; Norfolk, VA; United States

Sheta, Essam F., Moses, Robert W., Huttshell, Lawrence J., and Harrand, Vincent J., "An Active Smart Material Control System for F/A-18 Buffet Alleviation," International Forum on Aeroelasticity and Structural Dynamics; 4-6 June 2003; Amsterdam; Netherlands

Galea, Stephen C., Ryall, Thomas G., Henderson, Douglas A., Moses, Robert W., White, Edward V., and Zimcik, David G., "Next Generation Active Buffet Suppression System," Paper No. AIAA 2003-2905, AIAA International Air and Space Symposium and Exposition: The Next 100 Years, International Air and Space Symposium (Evolution of Flight), 14-17 July 2003, Dayton, Ohio, United States

Kuhl, Christopher A., Moses, Robert W., Croom, Mark A., and Sandford, Stephen P., "Parametric Study for Increasing On-Station Duration via Unconventional Aircraft Launch Approach," SPIE's 4th International Asia-Pacific Symposium on Remote Sensing of the Atmosphere, Ocean, Environment, and Space; 8-12 November 2004; Honolulu, HI; United States

Moses, Robert W., VanLaak, James, Johnson, Spencer L., Chytka, Trina M., Reeves, John D., Todd, B. Keith, Moe, Rud V., and Stambolian, Damon B., "Analysis of In-Space Assembly of Modular Systems," 1st Space Exploration Conference: Continuing the Voyage of Discovery; January 30 - February 1, 2005; Orlando, FL; United States

Moses, Robert W., "Regenerative Aerobraking," Space Technology and Applications International Forum (STAIF-2005); 13-17 February 2005; Albuquerque, NM; United States

Pototzky, Anthony S. and Moses, Robert W., "A Method to Analyze Tail Buffet Loads of Aircraft," RTO/AVT-123: Symposium on Flow Induced Unsteady Loads and the Impact on Military Applications; 25-29 April 2005; Budapest; Hungary

Moses, Robert W., Pototzky, Anthony S., Henderson, Douglas A., Galea, Stephen C., Manokaran, Donald S., Zimcik, David G., Wickramasinghe, Viresh, Pitt, Dale M., and Gamble, Michael A., "Actively Controlling Buffet-Induced Excitations," RTO/AVT-123 Symposium on Flow Induced Unsteady Loads and the Impact on Military Applications; 25-29 April 2005; Budapest; Hungary

Moses, Robert W. and Kuhl, Christopher A. and Templeton, Justin D., "Plasma Assisted ISRU at Mars," 15th International Conference on MHD Energy Conversion; 24-27 May 2005; Moscow; Russia

Bartels, Robert E., Moses, Robert W., Scott, Robert C., Templeton, Justin D., Cheatwood, F. McNeil, Gnoffo, Peter A., and Buck, Greg M., "A Proposed Role of Aeroelasticity in NASA's New Exploration Vision," International Forum on Aeroelasticity and Structural Dynamics 2005; 28 June - 1 July 2005; Munich; Germany

Moses, Robert W., Pototzky, Anthony S., Henderson, Douglas A., Galea, Stephen C., Manokaran, Donald S., Zimcik, David G., Wickramasinghe, Viresh, Pitt, Dale M., and Gamble, Michael A., "Controlling Buffeting Loads by Rudder and Piezo-Actuation," IFASD 2005: International Forum on Aeroelasticity and Structural Dynamics 2005; 28 June - 1 July 2005; Munich; Germany

Pototzky, Anthony S. and Moses, Robert W., "A Tail Buffet Loads Prediction Method for Aircraft at High Angles of Attack," IFASD 2005: International Forum on Aeroelasticity and Structural Dynamics 2005; 28 June - 1 July 2005; Munich; Germany

Masciarelli, James P., Lin, John K. H., Ware, Joanne S., Rohrschneider, Reuben R., Braun, Robert D., Bartels, Robert E., Moses, Robert W., Hall, Jeffery L., "Ultra Lightweight Ballutes for Return to Earth from the Moon," 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference; 1-4 May 2006; Newport, RI; United States

Vigil, Art and Rivas, Mauricio and Moses, Robert, "Constellation Program Flight Test Methodology and Strategy," 24th Aerospace Testing Seminar; 7-10 April 2008; Manhattan Beach, CA; United States

Popovic, S., Moses, R.W., and Vuskovic, L., "Systems Development for Mars Entry in Situ Resource Utilization," in *Proceedings of the 8th International Planetary Probe Workshop*, 2011, no. 1, 1-10.

Prabhu, Dinesh K., Spilker, Thomas R., Allen, Gary A., Jr., Hwang, Helen H., Cappuccio, Gelsomina, and Moses, Robert W., "Atmospheric Entry Studies for Venus Missions: 45 Sphere-Cone Rigid Aeroshells and Ballistic Entries," IEEE Aerospace Conference; 2-9 Mar. 2013; Big Sky, MT; United States

Prabhu, Dinesh K., Allen, Gary A., Hwang, Helen H., Cappuccio, Gelsomina, Spilker, Thomas R., and Moses, Robert W., "Ballistic Entries at Venus," 10th International Planetary Probes Workshop; 17-21 June 2013; San Jose, CA; United States

Prabhu, Dinesh K., Allen, Gary A., Hwang, Helen H., Cappuccio, Gelsomina, Spilker, Thomas R., and Moses, Robert W., "Atmospheric Entry Studies for Saturn Missions: 45 Sphere-Cone Rigid Aeroshells and Ballistic Entries," 8th International Planetary Probes Workshop (IPPW-8); 17-21 June 2013; San Jose, CA; United States

Agrawal, Parul and Allen, Gary A. and Hwang, Helen and Prabhu, Dinesh and Aliaga, Jose and Marley, Mark and McGuire, Kathy and Huynh, Loc and Garcia, Joseph and Moses, Robert and Winski, Rick and Skylanskiy, Evgeniy, "Atmospheric Entry Studies for Uranus," Uranus beyond Voyager 2 : from recent advances to future missions; 16-18 September 2013; Paris, France

Arney, Dale C., Jones, Christopher A., Klovstad, Jordan J., Komar, D.R., Earle, Kevin, Moses, Robert, and Shyface, Hilary R., "Sustaining Human Presence on Mars Using ISRU and a Reusable Lander," AIAA Space 2015; 31 August - 2 September 2015; Pasadena, CA; United States

Moses, Robert W. and Bushnell, Dennis M., "Frontier In-Situ Resource Utilization for Enabling Sustained Human Presence on Mars," NASA Technical Report, NASA/TM-2016-219182, April 2016.

Phojanamongkolkij, Nipa, Lee, Kristopher A., Miller, Scott T., Vorndran, Kenneth A., Vaden, Karl R., Ross, Eric P., Powell, Bobby C., and Moses, Robert W., "Modeling to Mars: a NASA Model Based Systems Engineering Pathfinder Effort," (AIAA 2017-5235), AIAA Space and Astronautics Forum and Exposition 2017; 12-14 September 2017; Orlando, FL; United States

Jefferies, Sharon A., Jones, Christopher A., Arney, Dale C., Stillwagen, Frederic H., Chai, Patrick R., Hutchinson, Craig D., Stafford, Matthew A., Moses, Robert W., Dempsey, James A., Rodgers, Erica M., Kwan, Henry H., and Downs, Sean P., "In-Space Assembly Capability Assessment for Potential Human Exploration and Science Applications," (AIAA 2017-5359), AIAA SPACE 2017 Conference; 12-14 September 2017; Orlando, FL; United States

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