

Curriculum Vitae

LAWRENCE DALE THOMAS

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EDUCATION: UNIVERSITY OF ALABAMA IN HUNTSVILLE, Ph.D., 1988.
Major: Systems Engineering.
First Minor: Computer Engineering
Second Minor: Mathematics
Dissertation: "A Methodology for Commonality Analysis, with Applications to Selected Space Station Systems."

NORTH CAROLINA STATE UNIVERSITY, M.S., 1983.
Major: Industrial Engineering.
Minor: Electronic Engineering
Thesis: "Word Selection for High Recognition Reliability in Automatic Speech Recognition Systems."

UNIVERSITY OF ALABAMA IN HUNTSVILLE, B.S.E., 1981.
Major: Industrial and Systems Engineering

LICENSE: Professional Engineer, Alabama #17107.

CERTIFICATION: INCOSE Expert Systems Engineering Professional (ESEP), #06467.

EXPERIENCE:

UNIVERSITY OF ALABAMA IN HUNTSVILLE, Huntsville, AL

Professor and Eminent Scholar in Systems Engineering (8/15 – present) Perform and guide research in systems engineering theory, with focus on systems complexity, systems integration, technical performance measurement, and systems engineering planning and management. Educate system engineering students in the art and science of systems architecture and design, systems integration, test, and verification, and systems management. Work closely with local and national organizations to assess and assure relevance of University's systems engineering research focus, facilities, and curricula, and participate in and lead local and national forums to determine systems engineering research agenda and advance educational and training methodologies. Also serve as Director of the Alabama Space Grant Consortium, Director of the Alabama NASA Established Program to Stimulate Competitive Research (EPSCoR), and Deputy Director of the UAH Propulsion Research Center.

EXPERIENCE (continued):

NASA, MARSHALL SPACE FLIGHT CENTER, Huntsville, AL

Associate Center Director (Technical) (3/11 – 7/15) Led technical activities for MSFC, working closely with senior managers across the Center and Agency to assure that MSFC programs and projects were safe, used technically appropriate designs, met technical performance needs, and were timely. Managed the MSFC Internal Research and Development Program. Chaired MSFC and NASA review panels and boards, assessed special program/project teams and personnel (contractor and Government) performance, and provided findings and recommendations to the Center Director and/or appropriate senior managers at the Center and Agency. Major accomplishments included establishment and leadership of the National Institute for Rocket Propulsion Systems and formation and leadership of the NASA Standing Review Board for the James Webb Space Telescope.

NASA, JOHNSON SPACE CENTER, Houston, TX

Program Manager, Constellation Program (5/10 – 3/11) Led development of NASA's next generation of human spaceflight systems. Directed the Ares I and V launch vehicle projects, the Orion spacecraft project, Extra Vehicular Activity project, Mission Operations project, Ground Operations project, and destination systems projects including the Altair lunar lander and lunar surface systems. Worked closely with managers of other human spaceflight programs including Space Shuttle and International Space Station regarding workforce, facility, and industrial base issues of strategic interest to the human spaceflight enterprise. Supported Agency leadership regarding Program engagement in strategic areas including education, legislative affairs, and public outreach. Major accomplishment was successful transition of Constellation Program elements to the three Programs – Orion, Space Launch System, and Ground Systems – that comprise NASA's Exploration Systems.

Deputy Program Manager, Constellation Program (11/07 – 5/10) Assisted the Program Manager in executive leadership of the program. Led Program Integration, providing executive guidance for Program Systems Engineering & Integration, Safety, Reliability, & Quality Assurance, Operations, Test & Integration, Program Planning & Control, and Information Systems. Served as the Constellation Program member on the Agency team planning the transition of Constellation from a developmental to an operational program, including interim collaborative efforts with the Space Shuttle Program. Major accomplishment was successful completion of the Constellation Program Preliminary Design Review.

EXPERIENCE (continued):

NASA, MARSHALL SPACE FLIGHT CENTER, Huntsville, AL

Associate Program Manager, Constellation Program (8/07 – 11/07) Reported to the Constellation Program Manager and provided the Program leadership at MSFC. Provided strategic input, from the MSFC perspective, to the Constellation Program Manager and his staff; conversely, provided strategic input, from the Constellation Program perspective, to the MSFC Director and his staff. Responsible for the development and implementation of efficient organizational and technical execution at MSFC for assigned Constellation Program Integration activities and functions. Responsible for identification, distribution, control and management of the Constellation Program Integration budget allocated to MSFC for assigned activities.

Chief, Systems Engineering Division (2/06 – 8/07) Managed the systems engineering workforce for all programs and projects supported by the Spacecraft & Vehicles Department at MSFC. Duties included systems engineering for Constellation activities including Ares launch vehicles and other MSFC-assigned Constellation Program tasks. Responsible for performance of functions including (i) requirements management, verification, and validation, (ii) systems management, (iii) systems engineering, (iv) ground operations & integrated logistics, (v) configuration and data management, (vi) risk assessment/management, and (vii) engineering planning. Also served as MSFC skill owner for systems engineering to ensure consistent implementation of tools and engineering best practices, developing and maintaining MSFC systems engineering standards, processes, tools, and engineering environments for systems analysis, systems engineering, and risk assessment for all MSFC programs/projects/tasks. Major accomplishment was establishment of the Systems Engineering Guide, a web-based systems engineering resource for MSFC.

Manager, Systems Engineering & Integration Office (9/04 – 2/06) Led Systems Engineering & Integration all programs and projects managed by the Space Transportation Programs & Projects Office (STPPO) at MSFC. Duties included providing lead systems engineers to all STPPO activities to ensure consistent implementation of tools and engineering best practices, developing and maintaining STPPO-unique standards, processes, tools, and engineering environments for systems analysis, systems engineering, and risk assessment. Major accomplishment included successful acquisition planning for systems engineering support contract for the newly formulated Constellation Program at NASA HQ.

EXPERIENCE (continued):

Director, Systems Management Office (6/02 – 9/04) Responsible for project management and systems engineering of MSFC programs and projects. Duties included definition of project management, systems engineering, cost analysis, and export control processes for MSFC consistent with Agency guidelines and directives. Duties also included support of advanced program and project planning for MSFC's three product line directorates and performing periodic independent assessments of ongoing program and project run-out costs. Major accomplishments included: (1) analysis of Orbital Space Plane Program workforce planning that led to significant budgetary changes, (2) establishment of new office within the Systems Management Office to provide integrated systems & technology analysis early in the program & project planning cycle to improve planning quality, and (3) establishment of the MSFC Project Management Board to guide the development of the MSFC program & project management, systems engineering, and program control workforce.

Manager, Systems Engineering and Integration Office (3/01 – 6/02) Led overall systems engineering & integration for the NASA Space Launch Initiative. Duties included definition of overall space transportation system architecture including the earth-to-orbit launch vehicle, ground and on-orbit infrastructure, upper stages, mission planning and operations, and maintenance of prototype technology development projects supportive of and consistent with the system architecture. Major accomplishments included (1) development of Systems Engineering Management Plan and (2) development of staffing plan and successful recruitment of personnel to fill identified positions.

Manager, Systems Engineering Office (4/99 – 2/01) Assured sufficiency of system engineering in all MSFC flight projects and programs. Responsible for formulating and leading center and agency initiatives in system engineering practice, evaluation, and tool/process development. Major accomplishments included (1) leadership of a major MSFC trade study on an Alternate Propulsion Module, (2) development of the System Engineering Development Plan, a roadmap of training and work experiences for developing system engineering personnel at MSFC, and (3) development of the MSFC System Engineering Overview, a one-day systems engineering training course.

EXPERIENCE (continued):

Chief, Systems Test Division (2/98 – 4/99) Managed functional test and checkout of launch vehicles, spacecraft, and payloads developed by the center and its contractors. Testing responsibilities included system qualification and acceptance, electromagnetic interference and compatibility, environmental, electrical component acceptance, and mechanical system leak testing. Division testing activities supported flight projects within all major MSFC programs including Space Transportation, Microgravity, Space Station, and Optics. Major accomplishments consisted of multiple initiatives to enable the division to better support future flight projects.

Technical Assistant to the Director, Systems Analysis and Integration Laboratory (4/96 - 2/98) Served as a Center and Agency expert in system engineering and integration (SE&I). Duties included serving as MSFC member on the NASA System Engineering Forum and participating in the Systems Analysis and Integration Laboratory (SAIL) system engineering process improvement team. Major accomplishments included: (1) development of a project plan and securing of funds for development of quantitative system engineering process metrics focused on system engineering product quality; (2) leading the NASA System Engineering Measurement Workshop, hosted by MSFC in December 1998; and (3) implementation of process capture, integration, and improvement methodology for SE&I within SAIL.

NASA, JOHNSON SPACE CENTER, Houston, TX

Manager, Space Station Vehicle Analysis and Integration Team (12/93 - 4/96) Led overall Flight Vehicle systems engineering and integration (SE&I) for the International Space Station and managed development of multi-use and Government Furnished Equipment (GFE) subsystem components. SE&I duties included leadership of Flight Vehicle configuration and subsystem architectures, design integration, test and verification. Component development duties included cost, schedule, and technical management. Major accomplishments included initial organizational development, planning and successful completion of four program design reviews, development and application of a cohesive engineering specification scheme, development and implementation of a GFE management scheme, and definition of program SE&I task content for Prime contract negotiation.

EXPERIENCE (continued):

NASA, MARSHALL SPACE FLIGHT CENTER, Huntsville, AL

Project Engineer (7/88-12/93) Technically managed selected disciplines in the Space Station detailed design and development activity. Duties include definition of required analyses and interface with European, Japanese, and Canadian space agencies regarding NASA Space Station efforts in these areas. Major accomplishments included negotiation of NASA/ESA/NASDA agreement on International Standard Payload Rack interfaces and securing program funding for development of an expert system for payload rack integration.

Aerospace Systems Engineer (6/83-7/88) Lead Engineer in the Space Station preliminary design activity with responsibility for the common equipment rack and overall commonality analysis of the MSFC elements of the Space Station. Major accomplishment was leading a \$1M contracted effort in the successful development of a commonality analytical model.

INTERNATIONAL BUSINESS MACHINES CORP., Raleigh, NC

Student Associate Engineer (5/82-6/83 and 6/81-9/81) Primarily responsible for the user specification of a Human Factors Test Laboratory. Work included a needs assessment, floorplan layout, equipment and construction justification, and computer/data acquisition system specification.

EXPERIENCE (continued):

UNIVERSITY OF ALABAMA IN HUNTSVILLE, Huntsville, AL

Industrial and Systems Engineering and Engineering Management Department: (6/84 – present)

Adjunct Associate Professor – (September 1991 appointment).

Associate Member of the Graduate Faculty – (August 1990 appointment).

Lecturer – (June 1984 appointment)

Classroom instruction includes:

- ISE 326 – Production & Operation Systems I (undergraduate)
- ISE 327 – Management Systems Analysis (undergraduate)
- ISE 328 – Introduction to Systems Engineering (undergraduate)
- ISE 390 – Probability & Engineering Statistics I (undergraduate)
- ISE 391/490 – Probability & Engineering Statistics II (undergraduate)
- ISE 480/580 – Systems Engineering Modeling (undergraduate/graduate)
- ISE 626 – Introduction to Operations Research (graduate)
- ISE 627 – Introduction to Systems Engineering (graduate)
- ISE 636/726 – Systems Modeling (graduate)
- ISE 637 – Systems Modeling & Analysis (graduate)
- ISE 639 – Integrated Model Development (graduate)
- ISE 690 – Statistical Methods for Engineers (graduate)
- ISE 790 – Advanced Statistical Methods for Engineers (graduate)

PROFESSIONAL AFFILIATIONS:

- Associate Fellow – American Institute of Aeronautics and Astronautics
- Senior Member – International Council on Systems Engineering
- Senior Member – Institute of Electrical and Electronics Engineers
- Member – American Nuclear Society
- Member – American Astronomical Society

HONORS AND AWARDS:

- Joint Army Navy NASA Air Force (JANNAF) Interagency Propulsion Committee Sustained Contribution Award (June 2015)
- Presidential Rank of Meritorious Executive (October 2014)
- NASA Medal for Outstanding Leadership (August 2012, June 2000)
- NASA Exceptional Service Medal (June 2007)
- NASA Exceptional Achievement Medal (June 2002)
- UAH Distinguished Engineering Alumni Academy (May 2002)
- Who's Who in America (2002)
- Who's Who in Science and Engineering (2000, 2001)
- NASA Silver Snoopy Award (February 1999)
- NASA Space Station Chester A. Vaughan Engineering Excellence Award (1996)
- UAH/IIE Graduate Research Award (First Place) for Doctoral Dissertation
- IIE Graduate Research Award (Third Place Nationally) for Master's Thesis
- Society of Manufacturing Engineers' Fellowship (1982)
- N.C. State Dean's Fellowship (1981)
- UAH Engineering Student of the Year (1980)
- Wernher von Braun Scholarship (1980)
- Who's Who Among American Colleges and Universities (1980)
- Phi Kappa Phi (Academic Honor Society, inducted 1980)
- Tau Beta Pi (Engineering Honor Society, inducted 1980)
- UAH Merit Scholarship (1978)

PROFESSIONAL ACTIVITIES:

- Reviewer, Wiley *Systems Engineering* journal (periodic)
- Reviewer, ASME *Journal of Computing and Information Science in Engineering* (periodic)
- Reviewer, MDPI *Systems* journal (periodic)
- Reviewer, MDPI *Modeling* journal (periodic)
- Reviewer, MDPI *Computation* journal (periodic)
- Reviewer, MDPI *Applied Sciences* journal (periodic)
- Reviewer, IEEE *Systems, Man, and Cybernetics* journal (periodic)
- Reviewer, IEEE *Systems Journal* (periodic)
- Reviewer, INCOSE International Symposium 2019, 2020, 2021

PROFESSIONAL ACTIVITIES (continued):

- Special Session Panelist, International Astronautical Congress 2025 (10/25)
- Plenary Panelist and Session Panelist, ANS Nuclear and Emerging Technologies for Space 2025 (5/25)
- Panelist, Wernher Von Braun Symposium (10/24)
- Keynote Speaker, 3rd Annual National Defense Industries Association Digital Engineering / MBSE Symposium (05/24)
- Member, Werner von Braun Symposium Planning Committee (2021 – 2024)
- Invited Speaker, Robert Coulter Seminar, Louisiana State University Department of Mechanical and Industrial Engineering (11/23)
- Panel Moderator, Wernher von Braun Symposium (10/17, 10/22)
- Commencement Speaker, UAH Fall Commencement for Colleges of Engineering and Nursing (12/19)
- Keynote speaker, UAH Tau Beta Pi initiation dinner (4/19)
- Session chair and judge for AIAA NextGen Symposium (10/17, 10/18)
- Panel moderator for UAH Space Day (10/18)
- Reviewer, 2019, 2024 Conference on Systems Engineering Research
- UAH Commercial Space Industry Roundtable Member (ongoing)
- Panel Moderator, AIAA Young Professionals Symposium (10/17)
- Panel Moderator & Session Chair, 2017 American Society for Engineering Management International Annual Conference (10/17)
- Keynote, National Science Foundation Workshop on Advanced Manufacturing Research in Aerospace (7/17)
- Panelist, AIAA Aviation Forum (6/17)
- Panel Moderator, NASA Human Spaceflight Knowledge Sharing Forum (11/16)
- Panel Moderator, AIAA Young Professionals Symposium (10/16)
- Panel Moderator, Wernher von Braun Symposium (10/16)
- Program Chair, 2016 Conference on Systems Engineering Research (3/16)
- Member, Vice Chair & Chair, State of Alabama Robotics Technology Park Board ('12 –'16)
- Government Chair – 2012 AIAA/ASME/SAE/ASEE Joint Propulsion Conference
- Chair – International Astronautical Federation Space Systems Committee ('05-'08)
- Session Chair – 53rd World Space Congress (10/02)
- Session Chair – 52nd, 54th, 55th, 56th, 57th, 58th, & 59th International Astronautical Congress (10/01, 10/03, 10/04, 10/05, 10/06, 10/07, & 10/08)

PROFESSIONAL ACTIVITIES (continued):

- Dinner Speaker – Annual Dinner Banquet of the Huntsville Chapter of the International Council on Systems Engineering (7/97, 9/05, 6/06)
- Session Chair – Fifth International Conference on Engineering, Construction, and Operations in Space (6/96)
- Robotics Panel member – Society of Logistics Engineers Annual Conf. (8/91)
- Technical Program Committee Member and Session Chair – Fifth Conference on Artificial Intelligence for Space Applications (5/90)

PUBLICATIONS:

Books and Book Chapters:

1. B. Nassersharif and D. Thomas, "Nuclear Propulsion," Chapter in *Propulsion Systems - Recent Advances, New Perspectives and Applications*, IntechOpen, 2023. DOI: 10.5772/intechopen.110616.
2. W. Larson, D. Kirkpatrick, J. Sellers, D. Thomas, & D. Verma (ed.), *Applied Space Systems Engineering*, McGraw-Hill, 2009.
3. D. Thomas, "Technical Planning," Chapter 13 in *Applied Space Systems Engineering*, edited by W. Larson et.al., McGraw-Hill, 2009.
4. V. Weyers and D. Thomas, "Alternate Architectural Concepts," Chapter 2 in *Space Launch and Transportation Systems*, Defense Information Technology Service, 2005.
5. E. Messerschmid, R. Bertrand, and D. Thomas, "Design and Sizing Space Elements," Chapter 11 in *Human Space Mission: Analysis and Design*, edited by W. Larson, McGraw-Hill, 1999.

Journal articles in preparation:

- D. Thomas, S. Raghu, G. Wang, M. Tudor, & A. Bower, "A Structural Margin based Design for Reducing the Test-Fail-Fix Cycle for Liquid Rocket Engines and its Implications on RS-25 Engine Affordability," *AIAA Journal of Spacecraft and Rockets*. (in preparation)
- A. Bendoyro, D. Thomas, J. Cassibry, & W. Emrich, "Mission Performance Impact of a Fission-Powered Exploration Rover," *Nuclear Technology*. (in preparation)
- W. Ziehm & D. Thomas, "A Figure of Merit for High-Thrust Trajectories to the Outer Solar System," *MDPI Aerospace*. (in preparation)
- S. Kumar, D. Thomas & J. Cassibry, "Integrated System Model for Robotic Missions using NTP," *Wiley Systems Engineering*. (in preparation)
- J. Kolligs & D. Thomas, "A Framework for the Media Selection of Requirement Expressions," *Wiley Systems Engineering*. (in preparation)

PUBLICATIONS (continued):

- S. Lakshmipuram Raghu, D. McDowell, J. Schneider, & D. Thomas, "Analytical Framework for Assessment of Fatigue Life in Additive Manufacturing based Superalloys for Propulsion Applications and its Implementation in a Model-based Environment," *Journal of Space Safety Engineering*. (in preparation)
- Da. Nikitaeva & D. Thomas, "Infrastructure Requirements for Missions Using Alternative Propellants for NTP," *Acta Astronautica*. (in preparation)
- D. Thomas & G. Jennings &, "A SysML Based X-in-the-Loop System Modeling Strategy," *IEEE Systems Journal*. (in preparation)
- D. Thomas, S. Daniel, & H. Smith, "A Risk Based Approach to Model Validation," *IEEE Systems Journal*. (in preparation)

Journal articles submitted & under review:

- D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "Centrifugal Nuclear Thermal Rocket Engineering Challenges and Research Progress," *Acta Astronautica*. (submitted)
- N. Hossain, A. Gorod, D. Thomas, R. Jaradat, & S. Fazio, "Toward Understanding and Assessing Key Attributes in Systems Engineering," *IEEE Access*. (under revision)
- M. Schroll, R. Frederick, & D. Thomas, "Reactor Core Geometry Optimization with Application for Centrifugal Nuclear Thermal Rockets," *Nuclear Technology*. (under revision)
- C. White, C. Eaton, T. Yeazitzis, D. Perner, A. Falcon, C. Martin, B. Mesmer, K. Weger, & D. Thomas, 'Inconsistent Interpretations of an "-ility" in Practice: A Survey of Affordability Definitions within NASA MSFC,' *MDPI Systems*. (under revision)

Journal articles published or accepted for publication:

1. B. Campbell & D. Thomas, "Estimation of Propellant Mass Requirements for Thruster-Driven Momentum Exchange Tether Deployer Vehicles," *MDPI Aerospace*. (accepted)
2. D. Van Bossuyt, A. Ledford, A. Wooley, J. Lussier, E. Hua, & D. Thomas, "Differentiating Between Digital Twins and Control Systems for Complex Systems," *ASME Journal of Computing and Information Science in Engineering*. (accepted) DOI: 10.1115/1.4070329
3. A. Ghossein, C. Mueller, J. Mulloy, A. Maldonado, & D. Thomas, "Analysis of NERVA Engine Performance using Point Kinetics-Based Power Balance Modeling," *Nuclear Engineering and Design*, 446(Part A), 114574, January 2026. DOI: 10.1016/j.nucengdes.2025.114574

PUBLICATIONS (continued):

4. M. Halvorson, N. Moyers, C. Domani, & D. Thomas, "Building an EMPIRE: Instantiating Logically Consistent System Models Using Ontological Architecture and Process Frameworks," *Acta Astronautica*, 238, pp. 755-79, January 2026. DOI: 10.1016/j.actaastro.2025.09.086
5. D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "Addressing challenges to engineering feasibility of the Centrifugal Nuclear Thermal Rocket," *Acta Astronautica*. Vol. 243, pp. 462-474. September 2025 DOI: 10.1016/j.actaastro.2025.05.007
6. J. Kolligs & D. Thomas, "Characterizing Efficacy of Alternative Media for Requirements Expression," *MDPI Systems*, 13(5), DOI: 10.3390/systems13050314
7. S. Kumar, D. Thomas & J. Cassibry, "Nuclear Thermal Propulsion Engine System Trades for Robotic Missions." *AIAA Journal of Spacecraft and Rockets*. Vol. 62, No. 5 (2025), pp. 1596-1605. DOI: 10.2514/1.A36308
8. D. Thomas, S. Rawlins, S. Raghu, & A. Aueron, "A Reliability-Driven Design and Test (ReDDT) Methodology for Space Nuclear Power and Propulsion Systems," International Association for the Advancement of Space Safety *Journal of Space Safety Engineering*. 12(1), pp. 53-64, March 2025. DOI: 10.1016/j.jsse.2025.03.002.
9. A. Ghossein, C. Mueller, J. Mulloy, & D. Thomas, "Automated Control for Nuclear Thermal Propulsion Transient Phases using Point Kinetics-Based Power Balance Modeling," *Annals of Nuclear Energy*. April 2025. DOI: 10.1016/j.anucene.2024.111166.
10. T. Yeazitzis, C. White, C. Eaton, K. Weger, B. Mesmer, & D. Thomas, "Employee Perceptions of Affordability at NASA MSFC," *Engineering Management Journal*. Available online March 3, 2025. DOI: 10.1080/10429247.2025.2462809.
11. S. Kumar, D. Thomas, & J. Cassibry, "Application of Nuclear Thermal Propulsion for Sustainable Cislunar Exploration," *Acta Astronautica*, March 2025, DOI: 10.1016/j.actaastro.2024.11.045.
12. P. Ligrani, D. McDowell, S. Raghu, & D. Thomas, "Structural Margin Statistical Analysis: Effects of Reduction Factors and Statistical Noise on Performance Parameters," *International Journal of Statistics and Applications*. DOI: 10.5923/j.statistics.20241403.01
13. D. Gorokhovskaya & D. Thomas, "Radiator Production for Pylon Fission Surface Power System through Lunar In-Situ Resource Utilization," *Nuclear Science and Technology Open Research* (NSTOR). DOI: 10.12688/nucscitechnolopenres.17501.1.
14. D. Thomas, "Nuclear Thermal Propulsion – Progress and Potential," International Association for the Advancement of Space Safety *Journal of Space Safety Engineering*, June 2024. DOI: 10.1016/j.jsse.2024.04.001.

PUBLICATIONS (continued):

15. D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "Research Progress toward Engineering Feasibility of the Centrifugal Nuclear Thermal Rocket," *Journal of the British Interplanetary Society*, 77, pp. 191-201, May 2024. DOI: 10.59332/jbis-077-05-0191.
16. W. Ziehm & D. Thomas, "Exploring the Feasibility of Kuiper Belt Missions Supported by Centrifugal Nuclear Thermal Propulsion," *Nuclear Technology*, April 2024. DOI: 10.1080/00295450.2024.2323242.
17. A. Aueron & D. Thomas, "Assessment of Electric Pump Fed Nuclear Thermal Propulsion for Near Term Missions," *AIAA Journal of Spacecraft and Rockets*, March 2024. DOI: 10.2514/1.A35805.
18. B. Campbell & D. Thomas, "Basic Orbit Design and Maneuvers for Satellite Constellations Deployed using Momentum Exchange Tethers," *MDPI Aerospace*, February 2024. DOI: 10.3390/aerospace11030182.
19. M. Schroll, P. D. na Ayuthya, R. Frederick, J. Cassibry, & D. Thomas, "Experimentally Backed Model of Bubbly Flow in a CNTP Reactor," *Acta Astronautica*. February 2024. DOI: 10.1016/j.actaastro.2023.12.012.
20. A. Bendoyro, D. Thomas, J. Cassibry, and W. Emrich, "Shielding Factors for a Fission-Powered Mars Exploration Rover," *Nuclear Science and Technology Open Research* (NSTOR). DOI: 10.12688/nucscitechnolopenres.17438.2.
21. Da. Nikitaeva & D. Thomas, "In-Situ Propellant Alternatives for a Lunar Ascent/Descent Vehicle," *AIAA Journal of Spacecraft and Rockets*. May 2023. DOI: 10.2514/1.A35507.
22. S. Rawlins & D. Thomas, "Reliability Assessment of Nuclear Thermal Engine Configuration and Health Monitoring System," *Journal of the British Interplanetary Society*, 76(4), April 2023. DOI: 10.59332/jbis-076-04-0145.
23. J. Kolligs & D. Thomas, "Alternate Media Viability for Systems Requirements," *Systems*, Volume 11, Issue 4, 176. March 2023. DOI: 10.3390/systems11040176.
24. Da. Nikitaeva & D. Thomas, "Propulsion Alternatives for Mars Vehicle Architectures Using In-Situ Propellants," *AIAA Journal of Spacecraft and Rockets*. March 2023. DOI: 10.2514/1.A35506.
25. D. Gorokhovskaya & D. Thomas, "In-Situ Resource Utilization on the Moon for Small Modular Nuclear Reactor Production," *Journal of the British Interplanetary Society*. 76(02), February 2023. DOI: 10.59332/jbis-076-02-0056.
26. V. Lopez & D. Thomas, "Metric for Structural Complexity Assessment of Space Systems Modeled Using the System Modeling Language," *Aerospace*. October 2022. DOI: 10.3390/aerospace9100612.

PUBLICATIONS (continued):

27. S. Rawlins & D. Thomas, "Feasibility of Low-Enriched Uranium Fueled Nuclear Thermal Propulsion in the Low-Thrust Region Below 16klbf," *Annals of Nuclear Energy*, 179(22), August 2022. DOI: 10.1016/j.anucene.2022.109368.
28. J. Grumbach & D. Thomas, "Quantitative Validation of the Principles of Complex System Integration," *Systems Engineering*. September 2022. DOI: 10.1002/sys.21641.
29. J. Grumbach & D. Thomas, "Systems Integration Implications of Component Reuse" *Systems Engineering*. August 2022. DOI: 10.1002/sys.21636.
30. D. Nikitaev & D. Thomas, "Impacts of In-Situ Alternative Propellant Utilization on Mars Vehicle Architectures Using Nuclear Thermal Propulsion," *AIAA Journal of Spacecraft and Rockets*. July 2022. DOI: 10.2514/1.A35399.
31. S. Kumar, D. Thomas, & J. Cassibry, "Decoding the Mission Design Problem for NTP Systems for Outer Planet Robotic Missions," *Nuclear Technology*. August 2022. DOI: 10.1080/00295450.2022.2096388.
32. D. Thomas, M. Houts, W. Walters, K. Hollingsworth, R. Frederick, & J. Cassibry, "Toward the Engineering Feasibility of the Centrifugal Nuclear Thermal Rocket," *Journal of the British Interplanetary Society*, 75(5) May 2022, pp. 181-188.
33. D. Nikitaev & D. Thomas, "Preliminary Results for In-Situ Alternative Propellants for Nuclear Thermal Propulsion," *Nuclear Technology*. March 2022. DOI: 10.1080/00295450.2021.2021768.
34. S. Kumar, D. Thomas, & J. Cassibry, "Nuclear Thermal Propulsion for Jupiter and Saturn Rendezvous Missions," *AIAA Journal of Spacecraft and Rockets*. February 2022. DOI: 10.2514/1.A35212.
35. D. Nikitaev & D. Thomas, "Alternative Propellant NTP Engine Architectures," *AIAA Journal of Spacecraft and Rockets*. January 2022. DOI: 10.2514/1.A35289.
36. D. Nikitaev & D. Thomas, "Seeded Hydrogen in Mars Transfer Vehicles Using Nuclear Thermal Propulsion," *AIAA Journal of Spacecraft and Rockets*. January 2021. DOI: 10.2514/1.A34722.
37. Morris, D. Thomas & K. Hollingsworth, "Stay Cool—Alternatives for Long-Term Storage of Large Quantities of Liquid Hydrogen on a Mars Transfer Vehicle," *Nuclear Technology*, 2020; 207(6), pp. 860-865. DOI: 10.1080/00295450.2020.1819157.
38. J. Grumbach & D. Thomas, "Integration Principles for Complex Systems," *Systems Engineering*. November 2020, pp. 684-706. DOI: 10.1002/sys.21554.
39. J. Kolligs & D. Thomas, "The Origins and Evolution of Requirements in Engineering," *IEEE Systems Journal*. 2020. DOI: 10.1109/JSYST.2020.2999557.
40. D. Nikitaev & D. Thomas, "Seeded Hydrogen in Nuclear Thermal Propulsion Engines," *AIAA Journal of Spacecraft and Rockets*, 2020. DOI: 10.2514/1.A34711.

PUBLICATIONS (continued):

41. D. Thomas & E. Patterson, "Systems Modeling Language Viewpoint Utilization to Facilitate Shared Mental Models among System Stakeholders," *Systems Research and Behavioral Science*, 2020;37 (1),128–140. DOI: 10.1002/sres.2610.
42. Aueron, D. Thomas, & J. Cassibry, "Analytical Modeling of Radiation Attenuation and Heat Deposition in Propellant for Nuclear Thermal Rockets," *AIAA Journal of Spacecraft and Rockets*, March 2019. DOI: 10.2514/1.A34389.
43. V. Lopez & D. Thomas. "Complexity assessment using SysML models." *Procedia Computer Science* 153 (2019): 225-232. DOI: 10.1016/j.procs.2019.05.074.
44. D. Thomas, J. Hanley, J. Rhatigan, & D. Neubek, "NASA's *Constellation* Program: The Final Word," *Systems Engineering*, 16(1), pp. 71-86, January 2013. DOI: 10.1002/sys.21219.
45. B. Muirhead & D. Thomas, "The Art & Science of Systems Engineering of Tightly Coupled Programs," *SAE Journal of Passenger Cars – Electronic and Electrical Systems*, 3(2), pp. 117-130, December 2010. DOI: 10.4271/2010-01-2321.
46. D. Thomas, "Selected Systems Engineering Process Deficiencies & Their Consequences," *Acta Astronautica*, 61, pp. 406-15, June/August 2007. DOI: 10.1016/j.actaastro.2007.01.005.
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1. T. Neal & D. Thomas, "A Spectral Clustering Approach for Module Formation Using Design Structure Matrices: Methodology and Metrics," 2026 AIAA SciTech, Orlando, Florida, January 12-16, 2026. (accepted)
2. M.A. Salunkhe & D. Thomas, "Low-Thrust Trajectory Design for Rendezvous Missions to Jupiter and Saturn Using Nuclear Electric Propulsion," 2026 AIAA SciTech, Orlando, Florida, January 12-16, 2026. (accepted)
3. M.A. Salunkhe & D. Thomas, "Low-Thrust Trajectory Design and Planetary Capture in Modern Astrodynamics," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.

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4. T. Neal & D. Thomas, "Enhancing Systems Integration Through Modular Design: A Framework for Efficient Testing and Assessment in Complex Systems," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.
5. S. Kumar, A. Bendoyro, & D. Thomas, "Comparative Analysis of Nuclear Thermal and Nuclear Electric Propulsion," 76th International Astronautical Congress, Sydney,
6. D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "Centrifugal Nuclear Thermal Rocket Engineering Challenges and Research Progress," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.
7. M. Schroll, D. Thomas, & R. Frederick, "Mission Burn Characterization Using a Centrifugal Nuclear Thermal Rocket," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.
8. B. Campbell & D. Thomas, "Analysis of a Launch Vehicle Upper Stage as a Momentum Exchange Tether Deployer," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.
9. S. Lakshmipuram Raghu, D. McDowell, J. Schneider, & D. Thomas, "Analytical Framework for Assessment of Fatigue Life in Additive Manufacturing based Superalloys for Propulsion Applications and its Implementation in a Model-based Environment," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.
10. E. Puccinelli, S. Rawlins, A. Pasini, & D. Thomas, "Pumps Reliability Increment as a Result of Autogenous Pressurization Applied to a Nuclear Thermal Propulsion System," 76th International Astronautical Congress, Sydney, Australia, September 29 – October 3, 2025.
11. Blackman, T., Kondrat'yev, J., Williams, O., Frederick, R.A., & Thomas, L. D., "Initial Atmospheric Results for Simulating a Centrifugal Nuclear Thermal Rocket Engine," Nuclear and Emerging Technology for Space, Huntsville, Alabama, May 4-8, 2025.
12. Kumar, S., Thomas, L. D., & Cassibry, J. T. "Mission Formulation using Digital Engineering for Nuclear Thermal Propulsion System," Nuclear and Emerging Technology for Space, Huntsville, Alabama, May 4-8, 2025.
13. Salunkhe, M., Xu, G., & Thomas, L. D., "Preliminary Low-Thrust Direct Trajectory Design using Nuclear Electric Propulsion for Rendezvous Missions to Jupiter," Nuclear and Emerging Technology for Space, Huntsville, Alabama, May 4-8, 2025.
14. Schroll, M., Frederick Jr., R, and Thomas, L. D., "Preliminary Study of Fission Product Entrainment Impact on a Centrifugal Nuclear Thermal Rocket," Nuclear and Emerging Technology for Space, Huntsville, Alabama, May 4-8, 2025.

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16. M. SureshKumar, H. Johnson, D. Thomas and H. Kannan, "A Systems Theoretic Perspective on Understanding Functional Equivalence in Systems Engineering," Conference on Systems Engineering Research 2025 (CSER 2025), Long Beach, California, March 18-21, 2025.
17. D. McDowell, S. Raghu, & D. Thomas, "Importance of Uncertainty Quantification in Rocket Engine Development using Additive Manufacturing and its implementation using MBSE," IEEE Aerospace Conference, Big Sky, Montana, March 1-8, 2025.
18. H. Johnson, H. Kannan, & D. Thomas, "Ontological Methods of Functional Analysis for Aerospace Concepts," IEEE Aerospace Conference, Big Sky, Montana, March 1-8, 2025.
19. B. Campbell, M. Chytka, & D. Thomas, "Flight Results from ADRASTEIA, a Spaceflight Demonstration of Motorized Momentum Exchange Tethers for Small Satellites," AIAA SciTech, Orlando, Florida, January 6-10, 2025. DOI: 10.2514/6.2025-2837.
20. H. Johnson, H. Kannan, & D. Thomas, "Ontology Based Functional Analysis of an Aerospace System," AIAA SciTech, Orlando, Florida, January 6-10, 2025.
21. D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "The Centrifugal Nuclear Thermal Rocket: Foundations, Challenges, and Progress," AIAA SciTech, Orlando, Florida, January 6-10, 2025.
22. C. White, C. Eaton, T. Yeazitzis, D. Perner, A. Falcon, B. Mesmer, K. Weger, & D. Thomas, "Inconsistent Interpretations of an "-ility" in Practice: A Survey of Affordability Definitions within NASA MSFC," AIAA SciTech, Orlando, Florida, January 6-10, 2025.
23. D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "Addressing challenges to engineering feasibility of the Centrifugal Nuclear Thermal Rocket," 75th International Astronautical Congress, Milan, Italy, October 14-18, 2024.
24. M. Halvorson, N. Moyers, C. Domani, & D. Thomas, "Building an EMPIRE: Instantiating Logically Consistent System Models Using Ontological Architecture and Process Frameworks," 75th International Astronautical Congress, Milan, Italy, October 14-18, 2024.
25. M. Salunkhe, G. Xu, & D. Thomas, "Review of Nuclear Electric Propulsion for Interplanetary Missions," 75th International Astronautical Congress, Milan, Italy, October 14-18, 2024.
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28. S. Kumar, D. Thomas, & J. Cassibry, "Nuclear Thermal Propulsion Architecture for Planetary Science Missions." at the session EXPL-19, Nuclear Technology for Space Mission, AIAA Aviation and ASCEND, Las Vegas, July 28- August 3, 2024.
29. S. Kumar, D. Thomas, & J. Cassibry, "Benefits of NTP in Cislunar Transportation System for NASA's Artemis Program," Nuclear and Emerging Technology for Space, Santa Fe, New Mexico, May 6-10, 2024.
30. M. Salunkhe, G. Xu, & D. Thomas, "Analysis of Thrust Level Effect on Nuclear Electric Propulsion Mission Trajectory and Mass for Jupiter Rendezvous," Nuclear and Emerging Technology for Space, Santa Fe, New Mexico, May 6-10, 2024.
31. M. Schroll, W. Ziehm, R. Frederick, & D. Thomas, "Preliminary Study of Alternative Propellant Performance with CNTP," Nuclear and Emerging Technology for Space, Santa Fe, New Mexico, May 6-10, 2024.
32. M. Halvorson, N. Moyers, S. Raghu, S. Rawlins, P. Sriman, T. Neal, C. Bentley, R. O'Neill, R. Lewis, J. Landberg, S. Gholston, D. Thomas, "An Ontological Foundation for the Verification and Validation of Complex Systems in the Age of Artificial Intelligence," Conference on Systems Engineering Research, Tuscon, Arizona, March 22-26, 2024.
33. S. Kumar, D. Thomas, & J. Cassibry, "Nuclear Thermal Propulsion: Trades and Sensitivity Analysis for Robotic Missions," AIAA SciTech, January 8-12, 2024.
34. H. Johnson, H. Kannan, & D. Thomas, "Demonstrating the Practicality of a Space Systems Ontology through Example Systems," AIAA SciTech, January 8-12, 2024. DOI: 10.2514/6.2024-1445
35. S. Raghu, S. Rawlins, & D. Thomas, "Demonstration of a Reliability-Driven Framework for Rocket Engine Development, Test, and Verification," AIAA SciTech, January 8-12, 2024.
36. A. Bendoyro, J. Cassibry, & D. Thomas, "Analysis of a Fission-Powered Mars Rover," AIAA SciTech, January 8-12, 2024.
37. C. White, C. Eaton, T. Yeazitzis, K. Weger, B. Mesmer, D. Thomas, "Survey Responses on Improvement Mechanisms of Affordability at NASA MSFC," American Society for Engineering Management 2023 International Annual Conference and 44th Annual Meeting, October 25–28, 2023.
38. D. Gorokhovskaya & D. Thomas, "Lunar In-Situ Resource Utilization of Aluminum Metal for Radiator Face Sheet Production of Pylon Fission Surface Power System," AIAA ASCEND, 23–25 October 2023.

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39. D. Thomas, "Nuclear Thermal Propulsion – Progress and Potential," International Astronautical Congress, Baku, Azerbaijan, October 2-6, 2023.
40. S. Raghu, J. Buettner, & D. Thomas, "Application of Model-Based Systems Engineering (MBSE) to Rocket Engine Affordability and Potentials," International Astronautical Congress, Baku, Azerbaijan, October 2-6, 2023.
41. D. Thomas, M. Houts, D. Wang, K. Hollingsworth, R. Frederick, & J. Cassibry, "Research Progress toward Engineering Feasibility of the Centrifugal Nuclear Thermal Rocket," International Astronautical Congress, Baku, Azerbaijan, October 2-6, 2023.
42. S. Kumar, D. Thomas, & J. Cassibry, "Application of Nuclear Thermal Propulsion for Sustainable Cislunar Exploration," International Astronautical Congress, Baku, Azerbaijan, October 2-6, 2023.
43. S. Rawlins & D. Thomas, "Application of the Reliability-Driven Design and Test Methodology to Nuclear Thermal Propulsion Systems," International Astronautical Congress, Baku, Azerbaijan, October 2-6, 2023.
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47. S. Rawlins & D. Thomas, "Overview of the Reliability Driven Design and Test Methodology Applied to Nuclear Thermal Propulsion Systems," Nuclear and Emerging Technologies for Space (NETS) 2023, Idaho Falls, Idaho, May 7-11, 2023.
48. W. Ziehm & D. Thomas, "Exploring the Feasibility of Kuiper Belt Missions Supported by Centrifugal Nuclear Thermal Propulsion," Nuclear and Emerging Technologies for Space (NETS) 2023, Idaho Falls, Idaho, May 7-11, 2023.
49. S. Kumar, D. Thomas, & J. Cassibry, "Preliminary Nuclear Thermal Propulsion Engine System Trades for Robotic Missions to Jupiter," Nuclear and Emerging Technologies for Space (NETS) 2023, Idaho Falls, Idaho, May 7-11, 2023.
50. Di. Nikitaeva & D. Thomas, "Radiation Production for Pylon Fission Surface Power System on the Moon," Nuclear and Emerging Technologies for Space (NETS) 2023, Idaho Falls, Idaho, May 7-11, 2023.

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52. M. Schroll, R. Frederick, & D. Thomas, "Reactor Core Geometry Optimization with Application for Centrifugal Nuclear Thermal Rockets," Nuclear and Emerging Technologies for Space (NETS) 2023, Idaho Falls, Idaho, May 7-11, 2023.
53. H. Johnson, D. Thomas, & M. Diaz, "Developing and Testing a Common Space Systems Ontology using the Ontological Modeling Language," IEEE Aerospace Conference, Big Sky, Montana, March 4-11, 2023. DOI: 10.1109/AERO55745.2023.10115927.
54. J. Buettner, S. Raghu, & D. Thomas, "A System Engineering Approach to Assess the Benefits of Additive Manufacturing for Rocket Engines," IEEE Aerospace Conference, Big Sky, Montana, March 4-11, 2023.
55. M. Houts, D. Thomas, & B. Nassersharif, "Centrifugal Nuclear Thermal Rocket Challenges and Potential," American Astronomical Society Rocky Mountain GN&C Conference, Breckenridge, Colorado, February 3-8, 2023.
56. W. Ziehm & D. Thomas, "Mission Design Analysis with Centrifugal Nuclear Thermal Propulsion," AIAA SciTech, National Harbor, Maryland, January 23-27, 2023.
57. J. Buettner, S. Raghu, & D. Thomas, "Understanding the Benefits of Utilizing Additive Manufacturing (AM) for Liquid Rocket Engine Components and its Quantification Using Model-Based Systems Engineering (MBSE)," AIAA SciTech, National Harbor, Maryland, January 23-27, 2023.
58. S. Rawlins & D. Thomas, "Nuclear Thermal Propulsion System-level Uncertainty Reduction Through Reliability-Driven Design," 13th Liquid Propulsion and 12th Spacecraft Propulsion Joint Army Navy NASA Air Force (JANNAF) Joint Subcommittee Meeting, Huntsville, Alabama, December 5-9, 2022.
59. W. Ziehm & D. Thomas, "Centrifugal Nuclear Thermal Propulsion for Scientific Missions to Jupiter," 13th Liquid Propulsion and 12th Spacecraft Propulsion Joint Army Navy NASA Air Force (JANNAF) Joint Subcommittee Meeting, Huntsville, Alabama, December 5-9, 2022.
60. M. Halvorson, N. Moyers, & D. Thomas, "An Ontology for Prognostic Health Management in Spacecraft Avionics," 14th Annual Conference of the Prognostics and Health Management Society, Nashville, Tennessee, November 1-4, 2022. DOI:10.36001/phmconf.2022.v14i1.3195.
61. D. Nikitaeva & D. Thomas, "Power Generation for Future Lunar Settlement Needs," AIAA ASCEND, Las Vegas, Nevada, October 23-25, 2022.

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62. S. Kumar, D. Thomas, & J. Cassibry, "Spacecraft Integrated System Model for NTP Powered Planetary Science Missions," 73rd International Astronautical Congress, Paris, September 18-24, 2022.
63. M. Schroll, B. Campbell, B. Landrum, R. Frederick, & D. Thomas, "Experimentally Backed Model of Bubbly Flow in a CNTP Reactor," 73rd International Astronautical Congress, Paris, September 18-24, 2022.
64. S. Rawlins & D. Thomas, "Reliability Assessment of Nuclear Thermal Engine Configuration and Health Monitoring System," 73rd International Astronautical Congress, Paris, September 18-24, 2022.
65. M. Halvorson, J. Fuchs, D. Thomas, S. Patel, & A. Blair "Model-Based Mission Planning: Reducing Mission Planning Costs by Generating Mission-Unique Architecture and Process Frameworks," 73rd International Astronautical Congress, Paris, September 18-24, 2022.
66. D. Nikitaeva & D. Thomas, "In-Situ Resource Utilization on the Moon for Small Modular Nuclear Reactor Production," 73rd International Astronautical Congress, Paris, September 18-24, 2022.
67. D. Thomas, M. Houts, W. Walters, K. Hollingsworth, R. Frederick, & J. Cassibry, "Early Progress Toward the Feasibility of the Centrifugal Nuclear Thermal Rocket," 73rd International Astronautical Congress, Paris, September 18-24, 2022.
68. M. Schroll, R. Frederick, & D. Thomas, "Baseline Analysis for Centrifugal Nuclear Thermal Rocket Engine Configuration," Nuclear and Emerging Technologies for Space (NETS) 2022, Cleveland, Ohio, May 8-12, 2022.
69. S. Kumar, D. Thomas, & J. Cassibry, "Development of Integrated NTP Mission Model for Planetary Science Missions," Nuclear and Emerging Technologies for Space (NETS) 2022, Cleveland, Ohio, May 8-12, 2022.
70. D. Nikitaeva & D. Thomas, "Power Generation on the Moon for Future In-Situ Resource Utilization," Nuclear and Emerging Technologies for Space (NETS) 2022, Cleveland, Ohio, May 8-12, 2022.
71. S. Rawlins & D. Thomas, "Derivation of NERVA's 'KEEP IT SIMPLE' System-Level Reliability Model," Nuclear and Emerging Technologies for Space (NETS) 2022, Cleveland, Ohio, May 8-12, 2022.
72. B. Campbell, R. Frederick, & D. Thomas, "Initial Experiment Designs Studying Gas Bubble Flows in Liquids for use in Centrifugal Nuclear Thermal Propulsion," Nuclear and Emerging Technologies for Space (NETS) 2022, Cleveland, Ohio, May 8-12, 2022.
73. A. Auerton & D. Thomas, "Preliminary Feasibility Study of Electric Pump Fed Nuclear Thermal Propulsion," Nuclear and Emerging Technologies for Space (NETS) 2022, Cleveland, Ohio, May 8-12, 2022.

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74. M. Halvorson, J. Fuchs, P. Kung, & D. Thomas, "A Model-Based Systems Engineering Approach to Space Mission Education of a Multidisciplinary, Geographically Disperse Student Workforce," 4th Symposium on Space Educational Activities, Barcelona, April 27-29, 2022.
75. M. Halvorson & D. Thomas, "Architectural Framework Standardization for Satellite Flight Software Generation Using MBSE and F²", IEEE Aerospace Conference, Big Sky, Montana, March 5-12, 2022.
76. J. Keese, B. Campbell, M. Schroll, W. Walters, K. Hollingsworth, R. Frederick, & D. Thomas, "Modeling and Experimental Investigation of Bubbly Flows in Liquid Metal for CNTF," IEEE Aerospace Conference, Big Sky, Montana, March 5-12, 2022.
77. S. Raghu, M. Tudor, D. Thomas, & G. Wang, "MBSE Utilization for Additive Manufactured Rocket Propulsion Components," IEEE Aerospace Conference, Big Sky, Montana, March 5-12, 2022.
78. A. Auerton & D. Thomas, "An Assessment of Electric Pump Fed Nuclear Thermal Propulsion," AIAA SciTech, January 3-7, 2022.
79. J. Keese, B. Campbell, M. Schroll, K. Hollingsworth, & D. Thomas, "Past Experimental Investigations of Bubbly Flow Applied to Centrifugal Nuclear Thermal Propulsion," AIAA SciTech, January 3-7, 2022.
80. D. Nikitaev & D. Thomas, "In-Situ Propellant Infrastructure for Alternative Propellant Nuclear Thermal Propulsion Engines," AIAA ASCEND, Las Vegas, Nevada, November 15-17, 2021.
81. N. Morris & D. Thomas, "ZBO Storage of Liquid Hydrogen Applied to the Mars Transfer Vehicle," 72nd International Astronautical Congress, Dubai, October 25-29, 2021.
82. E. Wood & D. Thomas, "Power Generation Alternatives for a Nuclear Thermal Propulsion Engine," 72nd International Astronautical Congress, Dubai, October 25-29, 2021.
83. D. Thomas, M. Houts, W. Walters, K. Hollingsworth, R. Frederick, & J. Cassibry, "Toward the Engineering Feasibility of the Centrifugal Nuclear Thermal Rocket," 72nd International Astronautical Congress, Dubai, October 25-29, 2021.
84. D. Nikitaev & D. Thomas, "Implications of ISRU Alternative Propellants for Nuclear Thermal Propulsion Engines," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.
85. D. Nikitaeva, D. Nikitaev, & D. Thomas, "Details of the Spacecraft Integrated System Model for Nuclear Thermal Propulsion Applications," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.

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86. D. Thomas, M. Houts, W. Walters, K. Hollingsworth, R. Frederick, & J. Cassibry, "Establishing the Feasibility of the Centrifugal Nuclear Thermal Rocket," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.
87. E. Wood & D. Thomas, "Nuclear Thermal Propulsion Engine Minimally-Intrusive Power Generation Alternatives," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.
88. S. Raghu & D. Thomas, "Modeling Behavior Elements for the RS-25 Engine using SysML for Improved Affordability," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.
89. S. Kumar, D. Thomas, & J. Cassibry, "Model-Based Approach for Conceptual Mission Design for NTP Enabled Robotic Missions," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.
90. M. Tudor, D. Thomas, & G. Wang, "Analysis and Utility of a Structural Margin Based Design for Failure Prone Components in Liquid Rocket Engines," AIAA Propulsion and Energy Forum and Exposition, Denver, August 9-11, 2021.
91. J. Keese & D. Thomas, "Liquid Propulsion System Testing Best Practices Approaches Applied to Nuclear Thermal Propulsion System Development," 68th Joint Army Navy NASA Air Force (JANNAF) Joint Subcommittee Meeting, virtual, June 7-17, 2021.
92. D. Nikitaev and D. Thomas, "Alternative Propellants for Nuclear Thermal Propulsion," 68th Joint Army Navy NASA Air Force (JANNAF) Joint Subcommittee Meeting, virtual, June 7-17, 2021.
93. D. Nikitaev & D. Thomas, "In-Situ Alternative Propellants for Nuclear Thermal Propulsion, Nuclear and Emerging Technologies for Space (NETS) 2021, virtual, April 26-30, 2021.
94. S. Kumar, D. Thomas, & J. Cassibry, "Decoding the Mission Design Problem for NTP Systems for Outer Planet Robotic Missions," Nuclear and Emerging Technologies for Space (NETS) 2021, virtual, April 26-30, 2021.
95. N. Morris, D. Thomas, & K. Hollingsworth, "A Cool Model to Analyze Heat Deposition on MTV Propellant Tanks," Nuclear and Emerging Technologies for Space (NETS) 2021, virtual, April 26-30, 2021.
96. E. Wood & D. Thomas, "Alternatives for Electrical Power Production from a Nuclear Thermal Propulsion Engine," Nuclear and Emerging Technologies for Space (NETS) 2021, virtual, April 26-30, 2021.
97. S. Kumar, D. Thomas, J. Cassibry, "Nuclear Thermal Propulsion for Outer Planets Robotic Exploration," 52nd Lunar and Planetary Science Conference, virtual, March 15-19, 2021.
98. I. Rountree & D. Thomas, "MBSE to Incorporate Human Systems Integration Modelling," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.

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99. S. Godshall & D. Thomas, "U.S. Space Force Collaborative Education System: Needs Analysis and Concept Exploration," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.
100. V. Lopez, A. Flint, & D. Thomas, "Programmatic Management for the AEGIS CubeSat in a Model Based System Engineering Environment," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.
101. S. Raghu & D. Thomas, "Model Based Failure Mode, Effects and Criticality Analysis (MBFMECA) for the RS-25 Engine using SysML," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.
102. D. Nikitaev & D. Thomas, "Transient Performance of a Nuclear Thermal Propulsion Engine Utilizing Seeded Hydrogen," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.
103. Aueron & D. Thomas, "Evaluating Tension between Specialization and Generalization in System Design with Excess Functionality," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.
104. D. Nikitaeva, D. Thomas, A. Aueron, S. Kumar, & D. Nikitaev, "Nuclear Thermal Propulsion Spacecraft Integrated System Model," AIAA SciTech, Nashville, Tennessee, January 11-15, 2021.
105. D. Nikitaev, S. Kumar, D. Thomas, & J. Cassibry, "Launch Vehicle Selection for Mars Transfer Vehicles Utilizing Seeded Hydrogen in a Nuclear Thermal Propulsion System," AIAA ASCEND, Las Vegas, Nevada, November 16-18, 2020.
106. A. Aueron and D. Thomas, "Value Driven Mars Architecture Design," AIAA Propulsion and Energy Forum and Exposition, New Orleans, August 24-26, 2020.
107. S. Kumar, D. Thomas, and J. Cassibry, "Preliminary Trajectory Design for Jupiter Rendezvous Mission Using Nuclear Thermal Propulsion," AIAA Propulsion and Energy Forum and Exposition, New Orleans, August 24-26, 2020.
108. S. Kumar, D. Thomas, J. Cassibry, and R. Frederick, "Review of Nuclear Thermal Propulsion Technology for Deep Space Missions," AIAA Propulsion and Energy Forum and Exposition, New Orleans, August 24-26, 2020.
109. N. Morris and D. Thomas, "A Cool Model to Analyze Heat Deposition on MTV Propellant Tanks," AIAA Propulsion and Energy Forum and Exposition, New Orleans, August 24-26, 2020.
110. E. Wood, D. Thomas, and J. Cassibry, "Minimally-Intrusive Power Generation Alternatives from a Nuclear Thermal Propulsion Engine," AIAA Propulsion and Energy Forum and Exposition, New Orleans, August 24-26, 2020.
111. A. Aueron & D. Thomas, "Mars Mission Architecture Decision through Value Models," Nuclear and Emerging Technologies for Space, American Nuclear Society Topical Meeting, Knoxville, Tennessee, April 6-9, 2020.

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112. E. Wood & D. Thomas, "Alternatives for Electrical Power Production from a Nuclear Thermal Propulsion Engine", Nuclear and Emerging Technologies for Space, American Nuclear Society Topical Meeting, Knoxville, Tennessee, April 6-9, 2020.
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114. I. Rountree, V. Lopez, & D. Thomas, "Change Management Processes in MBSE," 18th Conference on Systems Engineering Research, Redondo Beach, California, March 19-21, 2020.
115. Aueron, D. Thomas, & P. Collopy, "The Value of Enhanced Delta V Capacity: A Europa Clipper Case Study," 70th International Astronautical Congress, Paper IAC-19,D2,8-A5.4,12,x51117, Washington, DC, October 21-25, 2019.
116. Aueron & D. Thomas, "Nuclear Thermal Propulsion Vehicle Scaling and the Importance of Densified Propellant," AIAA Propulsion & Energy Forum, Indianapolis, Indiana, Paper AIAA-2019-3942, August 19-22, 2019.
117. D. Thomas, A. Aueron, V. Lopez, & A. Bower, "Virtual Systems Integration Applied to Advanced Space Systems," AIAA Propulsion & Energy Forum, Indianapolis, Indiana, August 19-22, 2019.
118. Aueron & D. Thomas, "Trades on Densified Propellant for Nuclear Thermal Propulsion," Nuclear and Emerging Technologies for Space, American Nuclear
119. S. Rawlins & D. Thomas, "A Proposed Solution to Address Nuclear Thermal Propulsion Fuel Embrittlement and Cryogenic Hydrogen Requirements," Nuclear and Emerging Technologies for Space, American Nuclear Society Topical Meeting, Richland, Washington, February 25 – 28, 2019.
120. J. Cassibry, D. Thomas, R. Wood, R. Frederick, and S. Kumar, "Development Plan for a Fission and Fusion Powered Propulsion System to Reach Mars in 45 Days," AAS Guidance Navigation and Control Conference, Breckenridge, Colorado, February 1-6, 2019.
121. H. Davidz, S. Jackson, & D. Thomas, "Systems Engineering Pathology: Comprehensive Characterization of Systems Engineering Dysfunction," INCOSE International Symposium, Washington, DC, July 7-12, 2018.
122. M. Gethers & D. Thomas, "Utilization of Goal Function Trees for Robust Requirements Definition," INCOSE International Symposium, Washington, DC, July 7-12, 2018.

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123. Aueron, D. Thomas, & J. Cassibry, "Analytical Radiation Attenuation and Heat Deposition Modeling for Conceptual Design of Nuclear Thermal Rockets," AIAA Propulsion & Energy Forum, Cincinnati, Ohio, July 9-11, 2018.
124. Bower & D. Thomas, "Creating an Affordability Model for the RS-25 Liquid Rocket Engine," AIAA Propulsion & Energy Forum, Cincinnati, Ohio, July 9-11, 2018.
125. R.A. Frederick, P. Ligrani, & D. Thomas, "Propulsion Research and Academic Programs at the University of Alabama in Huntsville - PRC Laboratory Capabilities - 2018," AIAA Propulsion & Energy Forum, Cincinnati, Ohio, July 9-11, 2018.
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