

Dr. Ali K. Raz

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Academic Degrees

Doctor of Philosophy in Aeronautics and Astronautics December 2016
Purdue University, West Lafayette, IN, USA
Dissertation: A System-of-Systems Perspective on Information Fusion System Design and Evaluation

Master of Science in Electrical Engineering August 2009
Iowa State University, Ames, IA, USA

Bachelor of Science in Electrical Engineering May 2005
Iowa State University, Ames, IA, USA

Academic Positions and Professional Experience

George Mason University, Fairfax, VA, USA

Assistant Professor, Systems Engineering and Operations Research (2021–Present)
Assistant Director of Intelligent Systems and Integration, C4I & Cyber Center of Excellence (2021–Present)

Air Force Research Laboratory, Rome, NY, USA

Summer Faculty Fellow (Summer 2023)
Air Force Office of Scientific Research

Naval Surface Warfare Center, Crane, IN, USA

Visiting Research Faculty (2019–2022)

Naval Postgraduate School, Monterey, CA, USA

Visiting Instructional Faculty (Fall 2020)

Purdue University, West Lafayette, IN, USA

Visiting Assistant Professor, School of Aeronautics and Astronautics (2019–2021)
Associate Research Scientist, Center for Integrated Systems in Aerospace (2017–2019)

John Hopkins University, Laurel, MD, USA

INCOSE Systems Engineering Fellow, Applied Physics Laboratory (Summer 2016)

Missile Defense Agency, Huntsville, AL, USA

Summer Intern for SBIR Evaluation (Summer 2015)

Honeywell Aerospace, Phoenix, AZ, USA

Systems Engineer for Flight Control and Flight Management System (2005-2011)
6+ years of Aerospace Design and Systems Engineering Industry Experience

Research Awards

Total Research Awards at Mason: \$13,675,702

My Share (PI/Co-PI): \$7,127,070

1. Scalable Training for Digital Transformation

- a. Award Amount: \$485,001
- b. My Share: \$133,375
- c. Awarding Agency: National Center for Manufacturing Sciences (NCMS)
- d. Research Team: Ali Raz (PI), Steve Kan (Co-PI)

2. Virtual Prototyping of Mission and Formation Concepts with Autonomy Enabled Ground and Air Systems

- a. Award Amount: \$303,886
- b. My Share: \$56,979
- c. Awarding Agency: US Army Ground Vehicle Systems Center
- d. Research Team: Joe Bricio-Neto (PI), Ali Raz (Co-PI), Vadim Sokolov (Co-PI)

3. Unified Secure Research and Development Environment for Ground Vehicle Systems Center

- a. Award Amount: \$599,996
- b. My Share: \$243,778
- c. Awarding Agency: US Army Ground Vehicle Systems Center
- d. Research Team: Joe Bricio-Neto (PI), Ali Raz (Co-PI)

4. SIMAC: Secure and Intelligent Multi-Agent Collaboration for Autonomous UGV-UAV Formations Using Multimodal AI and Neuromorphic Perception

- a. Award Amount: \$543,079
- b. My Share: \$322,480
- c. Awarding Agency: US Army Ground Vehicle Systems Center
- d. Research Team: Maryam Parsa (PI), Ali Raz (Co-PI)

5. AFCENT CEC Applied Research Phase III

- a. Award Amount: \$1,020,000
- b. My Share: \$51,000
- c. Awarding Agency: Air Force Research Laboratory (AFRL)
- d. Research Team: Brett Josephson (PI), Shima Mohebbi (Co-PI), Ali Raz (Co-PI), Cameron Nowzari (Co-PI), Daigo Shishika (Co-PI)

6. Integrated Photonics for Sustained Operations: Phase III

- a. Award Amount: \$296,998
- b. My Share: \$222,748
- c. Awarding Agency: Army Research Laboratory
- d. Research Team: Ali Raz (PI); Marc Sasseville (Co-PI)

7. MARAAI: Multi-Autonomy Reference Architecture for Artificial Intelligence Integration

- a. Award Amount: \$55,000
- b. My Share: \$55,000
- c. Awarding Agency: Collins Aerospace
- d. Research Team: Ali Raz (PI)

- 8. DoD System of Systems Engineering Guide Book Update**
 - a. Award Amount: \$81,097
 - b. My Share: \$81,097
 - c. Awarding Agency: Office of Undersecretary of Defense (OUSD)/SERC
 - d. Research Team: Ali Raz (PI)
- 9. MEADOW: Management Environment and Algorithms for Distributed Optimal Workflows**
 - a. Award Amount: \$350,000
 - b. My Share: \$350,000
 - c. Awarding Agency: Air Force Research Laboratory (AFRL)
 - d. Research Team: Ali Raz (PI)
- 10. Digital Enterprise Technology for Maintenance and Sustainment Improvements**
 - a. Award Amount: \$1,600,000
 - b. My Share: \$920,000
 - c. Awarding Agency: US Department of Defense
 - d. Research Team: Ali Raz (PI); Steve Kan (College of Science) (Co-PI)
- 11. Intent-based Orchestration in Distributed Command and Control (IBODC2) Software**
 - a. Award Amount: \$349,997
 - b. My Share: \$349,997
 - c. Awarding Agency: Air Force Research Laboratory (AFRL)
 - d. Research Team: Ali Raz (PI)
- 12. Integrated Photonics for Sustained Operations: Phase II**
 - a. Award Amount: \$600,000
 - b. My Share: \$450,000
 - c. Awarding Agency: US Department of Defense
 - d. Research Team: Ali Raz (PI); Eric Vollmecke (Co-PI)
- 13. Advanced Model-Based Tools for Portfolio Management and Analytic: System Architecture and Multi-Attribute Decision Making for Integrating Autonomy**
 - a. Award Amount: \$21,000
 - b. My Share: \$21,000
 - c. Awarding Agency: US Department of Defense (Stevens Institute of Technology)
 - d. Research Team: Ali Raz (PI)
- 14. Digital Engineering Tools for Acquisition Support: A Systematic Approach for Autonomous System Acquisition and Integration into SoS via Data-Driven Trade Studies**
 - a. Award Amount: \$20,500
 - b. My Share: \$20,500
 - c. Awarding Agency: US Department of Defense (Stevens Institute of Technology)
 - d. Research Team: Ali Raz (PI)
- 15. Integrated Photonics for Sustained Operations: Phase I**
 - a. Award Amount: \$900,000
 - b. My Share: \$450,000
 - c. Awarding Agency: National Center for Manufacturing Sciences (NCMS)

- d. Research Team: Ali Raz (PI) and Eric Vollmecke (Co-PI)

16. ARLIS Support for IARPA's STG AI-ML Solutions Program

- a. Award Amount: \$100,000
- b. My Share: \$25,000
- c. Awarding Agency: Intelligence Advanced Research Projects Activity (State of Maryland)
- d. Research Team: Ali Raz (PI), Co-PI: Paulo Costa, Shou Matsumoto, Ziyu Yao

17. AI and Data Analytics for Collision Risk Modeling

- a. Award Amount: \$553,696
- b. My Share: \$92,245
- c. Awarding Agency: Federal Aviation Administration / State of Maryland
- d. Research Team: Lance Sherry (PI), Co-PI: John Shortle, Tian Xu, Vadim Sokolov, Ran Ji, Ali Raz

18. Airspace Awareness Sensor Placement Modeling

- a. Award Amount: \$65,112
- b. My Share: \$21,701
- c. Awarding Agency: Virginia Innovation Partnership Corporation
- d. Research Team: Michael Hieb (PI), Co-PI: Lance Sherry, Ali Raz

19. Cybersecurity Vulnerability Assessment Models for Small Unmanned Aerial Systems Infrastructure in the Commonwealth

- a. Award Amount: \$80,000
- b. My Share: \$80,000
- c. Awarding Agency: Virginia Innovation Partnership Corporation
- d. Research Team: Ali Raz (PI)

20. Holistic Assurance Framework: Fast Time Emergent Scenario Simulation (FTESS)

- a. Award Amount: \$100,000
- b. My Share: \$20,000
- c. Awarding Agency: US Department of Defense (Stevens Institute of Technology)
- d. Research Team: Lance Sherry (PI), Co-PI: John Shortle, Brett Berlin, James Baldo, Ali Raz

21. AI Engineering Seedlings

- a. Award Amount: \$100,000
- b. My Share: \$25,000
- c. Awarding Agency: Intelligence Advanced Research Projects Activity (State of Maryland)
- d. Research Team: Ali Raz (PI), Co-PI: Paulo Costa, Shou Matsumoto, Ziyu Yao

22. Standardized High Level Data Fusion (HLDF) System Architecture for Counter Unmanned Aerial Systems (CUAS)

- a. Award Amount: \$299,947
- b. My Share: \$263,953
- c. Awarding Agency: US Navy (High Side Technology, LLC)
- d. Research Team: Ali Raz (PI) and Paulo Costa (Co-PI)

23. A Biologically-inspired, Lighter-than-air, Instructional, Mechatronics Program (BLIMP)

- a. Award Amount: \$299,658

- b. My Share: \$48,694
- c. Awarding Agency: Office of Naval Research (ONR)
- d. Research Team: Leigh McCue, Cameron Nowzari, Daigo Shishika, Jill Smith, Ali Raz, and Jessica Rosenberg

24. AI and Advanced Analytics for SAFE-SIM

- a. Award Amount: \$868,373
- b. My Share: \$694,702
- c. Awarding Agency: DARPA US Department of Defense (LinQuest Corporation)
- d. Research Team: Ali Raz (PI) and Paulo Costa (Co-PI)

25. Novel Hypersonic Vehicle Maneuvers Via Reinforcement Learning Techniques

- a. Award Amount: \$100,000
- b. My Share: \$100,000
- c. Awarding Agency: National Technology & Engineering Solutions of Sandia LLC
- d. Research Team: Ali Raz (PI)

Honors / Awards

- Outstanding Tenure-Track Assistant Professor, CEC, George Mason University, 2026
- Most Read Paper in INCOSE IS Proceeding in 2024, Wiley
- Most Read Paper in INCOSE IS Proceeding in 2025, Wiley
- Systems Engineering Best Journal Paper Award, 2020
- Systems Engineering Best Journal Paper Award, 2018
- John Hopkins University—Applied Physics Laboratory Alexander Kossiakoff Fellowship for Outstanding Contribution to Applied Systems Engineering Research
- Certificate of Appreciation for Outstanding Research Contribution, Missile Defense Agency
- Certificate of Recognition for Reviewer Contributions to INCOSE Systems Engineering Journal
- Outstanding Engineer Award (Results and Leadership) – Honeywell Aerospace

Invited Talks and Presentations:

- Invited Talks:
 - AAI: Systems Engineering based Test and Evaluation for AI, Singapore, January 2026
 - NSF Engineering Design and Systems Engineering Workshop on Artificial Intelligence, Purdue University, September 2025
 - Keynote Speaker, INCOSE Chesapeake Chapter Annual Gala, December 2024
 - INCOSE New England Chapter, Annual Conference, November 2024
 - Stanford University, Assoc. for Advancement of Artificial Intelligence, March 2024
 - INCOSE Europe, Middle East, and Africa Workshop, April 2023
 - INCOSE North Texas Chapter, April 2023
 - INCOSE Washington Metro Area Chapter, May 2022
 - SPIE Defense and Security, Invited Panel Discussion on Data Fusion, April 2021

- Stanford University, Assoc. for Advancement of Artificial Intelligence, March 2020
- Cornell University, Ezra Systems Scholar Program, October 2019
- State University of New York, Buffalo, October 2019
- Rand Corporation, Santa Monica, CA, 2019
- U.S. Navy – Naval Surface Warfare Center, Crane, IN, 2019
- North Carolina A&T State University Seminar on Information Fusion and System-of-Systems Research 2019
- Invited Focus Groups/Panels
 - Defensive AI and Cybersecurity, Commonwealth Cybersecurity Initiative Workshop, Istanbul, Turkey, 2026
 - Complex Aerospace Systems Exchange (CASE) Scholar on AI, AIAA SciTech 2020
 - United Nations Disarmament Research Institute, Washington D.C., 2019
- Government Agencies/Research Laboratories:
 - Subject Matter Expert Reviewer for Department of Homeland Security on Counter Unmanned Aerial Systems Proposals, 2026
 - Sandia National Laboratories invited lecture on “Introduction to Autonomous Mission Execution”, Summer 2021
 - U.S. Airforce Global Strike Command Innovation Summit on Future Nuclear Command and Control System, 2018 (*Presentation to AFGSC leadership*)
 - U.S. Navy ANTX Innovation and Sensor Fusion Experimentations Event, 2017
 - John Hopkins University Applied Physics Laboratory, INCOSE Fellowship Out brief, 2016
 - Research presentation to Missile Defense Agency Director Vice Admiral J.D. Syring, 2014
 - Research presentation to Missile Defense Agency Director Lt. Gen. Patrick O'Reilly, 2012
 - Classified presentation to Missile Defense Agency advance concepts group, 2014

Teaching

- **George Mason University, Systems Engineering and Operations Research**

Courses Taught:

- SYST 210: Systems Design (*Fall 2021, Fall 2022, Fall 2023, Fall 2024, Fall 2025*) (*Teaching Eval: 4.39; Course Eval: 4.35*)
- SYST 584: Heterogeneous Data Fusion (*Spring 2021, Spring 2022*) (*Teaching Eval: 4.0; Course Eval: 4.2*)
- SYST 505: Systems Engineering Principles (*Spring 2023*) (*Teaching Eval: 4.78; Course Eval: 4.93*)
- SYST 520: Systems Engineering Design (*Fall 2023, Spring 2026*) (*Teaching Eval: N/A; Course Eval: N/A*)

Courses Developed:

- System Engineering and Artificial Engineering (*assisted with syllabus development*)
- Introduction to System of Systems and Mission Engineering (*to be offered in Fall 2026*)
- **Student Mentoring at George Mason University**
 - Post-Doctoral Students
 - i. Dr. Mohammadreza Torakjazi (2025 to Present)
 - ii. Dr. Farid Sahebsara (2025 to Present)
 - Doctoral Students as Thesis Advisor
 - i. Mohammadreza Torakjazi (*Graduated Summer 2025*)
 - ✓ *Excellence in Systems Engineering Doctoral Research Award*
 - ii. Brooke Prigg (*2nd year*)
 - iii. John Byungill (*2nd Year*)
 - iv. Syrena Prynko (*starting Fall 2026*)
 - ✓ *GMU's First Draper Scholar*
 - Doctoral Students as Committee Member
 - i. Sai Gayatri Annamreddy (*Cyber Security Systems Engineering*)
 - ii. Akra Gosh (*Information Technology*)
 - iii. Busra Ozoglu (*Graduated Fall 2023*)
 - iv. Abhishek Paudel (*Computer Science Graduated Fall 2025*)
 - External Doctoral Students Committee Service
 - i. Christopher Tommila (*MIT – Aeronautics and Astronautics*)
 - ii. Samuel Almeida (*WPI – Systems Engineering*)
 - Master Students (Thesis/Academic Advisor)
 - i. Trevor Geissler
 - ii. Omar Zeki
 - iii. Sara Khatouri (*Graduated Spring 2026*)
 - ✓ *Excellence in Systems Engineering Master's Research Award*
 - iv. Carolyn Vaseghi (*Graduated Fall 2025*)
 - v. Mohammed Bhuiyan (*Graduated, Fall 2024*)
 - vi. Brooke Prigg (*Graduated, now doctoral student*)
 - Undergraduate Research Associate Students
 - i. Madeline Gray
 - ii. Markus Garretson
 - iii. Dyar Aziz
 - iv. Brandt Sandman
 - v. Darius Jack
 - vi. Maha Raja
 - vii. Grean Ramos

- **Naval Post Graduate School, Department of Systems Engineering**
 - System of Systems Engineering, Graduate Course
- **Purdue University, School of Aeronautics and Astronautics**
 - Introduction to Aerospace Design, Sophomore level
 - Aerospace Systems Design, Junior/Senior level
 - Design Theory & Methods for Aerospace Systems, Graduate level
- **Short-Courses/Tutorials:**
 - Introduction to Digital Engineering and Digital Transformation
 - i. U.S. Army Ground Vehicle Systems Center
 - ii. IEEE Digital Avionics Systems Conference, 2025
 - Introduction to Information Fusion for Aerospace Applications
 - i. AIAA Professional Development Course 2021
 - Artificial Intelligence and Systems Engineering
 - i. INCOSE IS 2021, 2022, 2023
 - Statistical Methods for Information Fusion System Design and Performance Evaluation
 - i. IEEE SMC and Information Fusion Conferences 2018, 2019, 2022
 - ii. National Symposium on Sensor and Data Fusion 2023 (*invited*)

Academic and Professional Society Service

- **George Mason University**
 - Search Committee Member for Department Chair Search, 2024
 - Search Committee Member for Research Faculty, 2021
 - Search Committee Member for Tenure Track Faculty, 2022-2023
 - SEOR Colloquium Committee Member, 2021,2022, 2023, 2025
- **Appointment to Advisory Boards**
 - University of South-Eastern Norway, Centre for Effective Engineering and Learning in Complex Systems (CELECT), 2025-Present
 - Mathworks MATLAB Sensor Fusion Advisory Board Member, 2022-Present
 - Dassault Systemes Academic Advisory Board Member for Model-based Systems Engineering (MBSE), 2019-2020
- **Professional Society Leadership**
 - Chair of AIAA Information, Command, and Control Systems Technical Committee
 - Chair of INCOSE AI Working Group
 - Executive Steering Committee Member for AIAA Defense Forum

- Past Co-Chair of INCOSE AI Working Group
- Past Co-Chair of INCOSE Complex Systems Working Group
- American Institute of Aeronautics and Astronautics (AIAA)
 - Member grade: Senior Member
 - Session Chair and Reviewers for multiple AIAA SciTech conferences
 - Rising Leaders in Aerospace (RLA) Chair for SciTech 2018 & 2019
- International Council on Systems Engineering (INCOSE)
 - Member Grade: Certified Systems Engineering Professional (CSEP)
 - Vice President Crossroads of America Chapter 2019-2020
 - Assistant Director for Early Career Professionals
 - Certification Exam Reviewer
 - President of INCOSE Purdue student chapter (2015-2016)
- Institute of Electrical and Electronics Engineering (IEEE)
 - Member grade: Senior Member
 - Member Aerospace Electronic Systems Society and Systems, Man, and Cybernetics (SMC) Society
 - Avionics Systems Pannel Member
- Editor Roles
 - Associate Editor for IEEE Transactions on Aerospace and Electronic Systems
 - Guest Associate Editor for INCOSE Systems Engineering Journal Special Issue on AI and Systems Engineering
 - Associate Editor for Systems Engineering Body of Knowledge (SEBoK) Emerging Knowledge Area
- Journal reviewer for:
 - INCOSE Systems Engineering Journal
 - IEEE Systems Journal
 - AIAA Journal of Aerospace Information Systems
 - IEEE Transactions on Systems, Man, and Cybernetics: Systems

Certifications

Certified Systems Engineering Professional - CSEP

International Council on Systems Engineering – INCOSE

Applied Management Principles – Graduate Certificate

Krannert School of Management, Purdue University

Publications and Patents

Google Scholar Total Citations: 755

Google Scholar h-index: 16
(as of May 2026)

Patents

- P-1. **A. K. Raz**, M. Gamarra, "System and Method for Mission Engineering", Patent Pending with U.S PTO, filed by U.S. Department of the Air Force, Air Force Research Laboratory (2026) (AFD-2640)
- P-2. **A.K. Raz**, R. Ganesan, K.C. Chang, A. Barreto, J. Ferrari, M. Hieb, P. Costa, "Sensor Placement and Optimization for Counter UAV Systems, Patent Application Pending with U.S PTO, filing in progress by George Mason University (GMU-26-008P)
✓ *Licensed Software: MUSCAT: Mason UAV Systems Cyber Analysis Testbed, (GMU: LIC-26-005)*
- P-3. **A.K. Raz**, M. Hieb, D. Maxwell, "Intent-Based Networking for Distributed Command and Control, Provisional Patent Application Pending, George Mason University

Book Chapters/Magazine Articles

- B-1. **A. K. Raz**, D. A. DeLaurentis, and J. Hudack, "Managing System of Systems Complexity for Distributed Operations," in *Complex Aerospace Systems*, Reston, VA: American Institute of Aeronautics and Astronautics, 2026. (in publication review)
- B-2. D. DeLaurentis, **A. K. Raz**, and C. Guariniello, "MBSE for System-of-Systems," in *Handbook of Model-Based Systems Engineering*, A. M. Madni, N. Augustine, and M. Sievers, Eds., Springer International Publishing, 2022, pp. 1–29. doi: 10.1007/978-3-030-27486-3_59-1.
- B-3. H. Y. Fouad, **A. K. Raz**, J. Llinas, W. F. Lawless, and R. Mittu, "Finding the Path Toward Design of Synergistic Human-Centric Complex Systems," in *Engineering Artificially Intelligent Systems: A Systems Engineering Approach to Realizing Synergistic Capabilities*, W. F. Lawless, J. Llinas, D. A. Sofge, and R. Mittu, Eds. Springer International Publishing, 2021, pp. 73–89. doi: 10.1007/978-3-030-89385-9_5.
- B-4. **A. K. Raz**, J. Llinas, R. Mittu, and W. F. Lawless, "Engineering for emergence in information fusion systems: A review of some challenges," in *Human-Machine Shared Contexts*, W. F. Lawless, R. Mittu, and D. A. Sofge, Eds., Academic Press, 2020, pp. 241–255. doi: 10.1016/B978-0-12-820543-3.00012-2.
- B-5. Maheshwari, **A. K. Raz**, D. A. DeLaurentis, A. Murphy, and O. Kolawole, "Integrating SysML and Agent-Based Modeling for Rapid Architecture Evaluation," *INSIGHT*, vol. 21, no. 2, pp. 47–51, 2018, doi: 10.1002/inst.12205.
- B-6. R. Cruise, E. Blasch, S. Natarajan, and **A. K. Raz**, "Command Guided Swarms," *Defense Systems Information Analysis Center*, Spring, 2018.

Journal Articles

- J-1. S. Khatouri, F. Sahebsara, M. R. Hieb, L. W. Berklich, **A. K. Raz**, "Digital Twin–Enabled Architectures for Autonomous Systems via Model-Based Systems Engineering", *INCOSE Systems Engineering Journal*, (Submitted), (IF 1.8)
- J-2. **A.K. Raz**, R. Ganesan, K.C. Chang, B. Jang, A. Barreto, J. Ferrari, M. Hieb, B. Josephson, "MUSCAT: A Sensor Placement Optimization and Sensor Fusion Testbed for Counter Uncrewed Aerial Systems", *IEEE Transactions on Aerospace and Electronic Systems* (Submitted) (IF:5.7)
- J-3. **A.K. Raz**, M. Hieb, S. Alam, A. Talukdar, C. Vaseghi, S. Babcock, D. Maxwell, V. Omelko, and R. Hilliard, "Intent-Based Networking for Distributed Command-and-Control and System of Systems", *INCOSE Systems Engineering* (submitted) (IF:1.9)
- J-4. F. Sahebsara, M. Hieb, **A.K. Raz**, "Model-Based Systems Engineering as a Foundational Enabler of Digital Twin: An In-Depth Systematic Review", *IEEE Open Journal of Systems Engineering*, (in revision)
- J-5. K.C. Chang, **A.K. Raz**, M. R. Hieb, R. Ganesan, "From ROC to SOC; A predictive Sensor Fusion Framework for Counter Uncrewed Aerial Vehicles", *IEEE Transactions on Aerospace and Electronic Systems* (IF:5.7)
- J-6. **A. K. Raz** and M. Gamarra, "A Desirability Assessment Framework for System of Systems", *IEEE Systems Journal* (in revision) (IF:4.4)
- J-7. M. Torkjazi and **A. K. Raz**, "A Systems Engineering Methodology for the System of Autonomous Systems: Test and Evaluation", *INCOSE Systems Engineering*, 2026 (IF 1.6; 9% acceptance rate)
- J-8. M. Torkjazi and **A. K. Raz**, "A Systems Engineering Methodology for System of Autonomous Systems: Architecture and Integration", *INCOSE Systems Engineering*, 2025 (IF 1.6; 9% acceptance rate)
- J-9. **A. K. Raz**, K. Mall, S. M. Nolan, W. Levin, A. Mia, L. Mockus, K. Ezra, K. Williams, and J. Parish "Explainable AI and Robustness based Test and Evaluation of Reinforcement Learning," *IEEE Transactions on Aerospace and Electronic Systems*. 2024 (IF:5.7)

- J-10. **A. K. Raz**, M. Bhuiyan, J. Bricio-Neto, C. Santos, and D. Maxwell, "Conceptual, Mathematical, and Analytical Foundations for Mission Engineering and System of Systems Analysis," *IEEE Systems Journal*. 2024. (IF: 4.4)
- J-11. M. Torkjazi and **A. K. Raz**, "A Review on Integrating Autonomy into System of Systems: Challenges and Research Directions." *IEEE Open Journal of Systems Engineering* 2024.
- J-12. **A. K. Raz**, D. A. DeLaurentis, and J. Hudack, "Managing Complexity in Distributed Command and Control (C2) Systems," *Journal of DoD Research and Engineering*, Jun. 2022.
- J-13. A. Dachowicz, K. Mall, P. Balasubramani, A. Maheshwari, **A. K. Raz**, P. Jitesh, D. DeLaurentis, "Mission Engineering and Design Using Real-Time Strategy Games: An Explainable AI Approach," *Journal of Mechanical Design*, vol. 144, no. 2, Nov. 2021, doi: 10.1115/1.4052841. (IF 3.8)
- J-14. **A. K. Raz**, P. C. Wood, L. Mockus, and D. A. DeLaurentis, "System of systems uncertainty quantification using machine learning techniques with smart grid application," *Systems Engineering*, vol. 23, no. 6, pp. 770–782, 2020, doi: <https://doi.org/10.1002/sys.21561>. (IF 1.9)
- J-15. A. Guerrero de la Peña N. Davendralingam, **A. K. Raz**, D. DeLaurentis, G. Shaver, V. Sujan, N. Jain, "Projecting adoption of truck powertrain technologies and CO2 emissions in line-haul networks," *Transportation Research Part D: Transport and Environment*, vol. 84, p. 102354, 2020, doi: 10.1016/j.trd.2020.102354. (IF 7.6)
- J-16. A. Guerrero de la Peña A. Guerrero de la Peña N. Davendralingam, **A. K. Raz**, D. DeLaurentis, G. Shaver, V. Sujan, N. Jain, "Projecting line-haul truck technology adoption: How heterogeneity among fleets impacts system-wide adoption," *Transportation Research Part E: Logistics and Transportation Review*, vol. 124, pp. 108–127, Apr. 2019, doi: 10.1016/j.tre.2018.12.017. (IF 10.6)
- J-17. **A. K. Raz**, C. R. Kenley, and D. A. DeLaurentis, "System architecting and design space characterization," *Systems Engineering*, vol. 21, no. 3, pp. 227–242, May 2018, doi: 10.1002/sys.21439. (IF 2.0) (Best Journal Paper Award)
- J-18. C. Guariniello, S. Tamaskar, Z. Fang, N. Davendralingam, **A. K. Raz**, and D. A. DeLaurentis, "System-of-Systems tools and techniques for the analysis of Cyber-Physical Systems," *Systems Engineering*, vol. 23, no. 4, pp. 480–491, July 2022, (IF 2.0) (Best Papers of 2020)
- J-19. **A. K. Raz**, C. R. Kenley, and D. A. DeLaurentis, "A System-of-Systems perspective for information fusion system design and evaluation," *Information Fusion*, vol. 35, pp. 148–165, Elsevier, May 2017. (IF 18.6)

Refereed Conference Papers

- C-1. **A.K. Raz**, M. Hieb, D. Maxwell, V. Omelko, A. Beckus, and R. Hilliard. "Intent-based Networking for Distributed Command-and-Control Systems: A Conceptual Framework with System of Systems." In *2025 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, pp. 6714-6719. IEEE, 2025.
- C-2. Chang, K. C., **Raz, A. K.**, Hieb, M. R., & Ganesan, R. "Predicting Sensor Fusion Performance for Situation Assessment in Countering Aerial Threats." In *2025 28th International Conference on Information Fusion (FUSION)* (pp. 1-8). IEEE.
- C-3. A. Dyar, M. Garretson, M. Hieb, and **A. K. Raz**. "Model-based Automated Intent Estimation of Unmanned Aerial Vehicles with Sensor Fusion". In *2024 AIAA DATC/IEEE 43rd Digital Avionics Systems Conference (DASC)* (pp. 1-7). September 2024, IEEE.
- C-4. M. Torkjazi and **A. K. Raz**, "Model-Based Systems Engineering (MBSE) Methodology for Integrating Autonomy into a System of Systems Using the Unified Architecture Framework." In *INCOSE International Symposium*, vol. 34, no. 1, pp. 1051-1070. 2024. (Wiley Most Read Paper in symposium proceeding, 2025)
- C-5. M. Torkjazi and **A. K. Raz**, "Predictive and Prescriptive Analyses of Autonomy Integration into the System of Systems." In *Conference on Systems Engineering Research*, pp. 213-228. Cham: Springer Nature Switzerland, 2024.
- C-6. **A. K. Raz** and M. Gamarra. "Mission Engineering: Analysis of Mission Threads with System of Systems Interdependence." *2024 IEEE International Systems Conference (SysCon)*. IEEE, 2024.
- C-7. M. Torkjazi and **A. K. Raz**, "Data-Driven Approach with Machine Learning to Reduce Subjectivity in Multi-Attribute Decision Making Methods," in *2023 IEEE International Systems Conference (SysCon)*, IEEE, 2023, pp. 1–8.
- C-8. S. Srivastava, G. Singh, S. Matsumoto, **A. K. Raz**, P. Costa, J. Poore, and Z. Yao, "MAILEX: Email Event and Argument Extraction," in *Empirical Methods in Natural Language Processing (EMNLP)*, Singapore, 2023. (Acceptance Rate 28%)
- C-9. **A. K. Raz**, W. Miller, K.-C. Chang, Y. Lin, and E. Blasch, "Explainable AI and Counterfactuals for Test and Evaluation of Intelligent Engineered Systems," in *INCOSE International Symposium*, 2023, pp. 1524–1539. (Wiley Most Read Paper in symposium proceeding, 2024)
- C-10. L. McCue, A. Hagarty, C. Nowzari, **A. K. Raz**, M. Riggi, J. Rosenberg, D. Shishika, C. Smith, and J. Nelson, "Lessons Learned in the Development of a STEM Outreach Program for Biologically Inspired Underwater Robotics," in *2023 ASEE Annual Conference & Exposition*, 2023.
- C-11. Z. Fan, K. Chang, **A. K. Raz**, A. Harvey, and G. Chen, "Sensor Tasking for Space Situation Awareness: Combining Reinforcement Learning and Causality," in *2023 IEEE Aerospace Conference*, IEEE, 2023

- C-12. P. K. de Albuquerque, J. F. Ferrari, M. Hieb, P. Costa, L. Sherry, and **A. K. Raz**, "Multi-Sensor Placement and Information Fusion Analysis to Enable Beyond Visual Line of Sight Operations for Small Uncrewed Aerial Vehicles," in *2023 IEEE/AIAA 42nd Digital Avionics Systems Conference (DASC)*, IEEE, 2023, pp. 1–8.
- C-13. M. Torkjazi and **A. K. Raz**, "A taxonomy for system of autonomous systems," in *2022 17th Annual System of Systems Engineering Conference (SOSE)*, IEEE, 2022, pp. 198–203.
- C-14. L. Sherry, S. Ansari, J. Baldo, B. Berlin, J. Shortle, and **A.K. Raz**, "Potential for Using Deep Learning for Digital-Twin System Validation Testing," in *2022 IEEE/AIAA 41st Digital Avionics Systems Conference (DASC)*, IEEE, 2022, pp. 1–6.
- C-15. **A. K. Raz**, S. M. Nolan, W. Levin, K. Mall, A. Mia, L. Mockus, K. Ezra, and K. Williams, "Test and evaluation of reinforcement learning via robustness testing and explainable ai for high-speed aerospace vehicles," in *2022 IEEE Aerospace Conference (AERO)*, IEEE, 2022, pp. 1–14.
- C-16. L. McCue, A. Hagarty, C. Nowzari, **A. K. Raz**, M. Riggi, J. Rosenberg, D. Shishika, C. Smith, and J. Nelson, "Work-in-Progress: Development of a new hands-on STEM program for biologically inspired maritime robotics," in *2022 ASEE Annual Conference & Exposition*, 2022.
- C-17. A. Fentiman, J. Sutherland, D. DeLaurentis, K. Douglas, J. D. Camba, C. R. Kenley, **A. K. Raz**, A. Koehler, W. Huang, A. Hurt, and J. Richardson, "Work in Progress: Aligning a Professional Development Program with Industry Needs," in *2022 ASEE Annual Conference & Exposition*, 2022.
- C-18. E. Blasch, A. Savakis, Y. Zheng, G. Chen, I. Kadar, U. Majumder, and **A. K. Raz**, "Joint data learning panel summary," in *Signal Processing, Sensor/Information Fusion, and Target Recognition XXXI*, SPIE, 2022, pp. 138–154.
- C-19. D. DeLaurentis, P. Jitesh, **A. K. Raz**, P. Balasubramani, A. Maheshwari, A. Dachowicz, and K. Mall, "Toward automated game balance: A systematic engineering design approach," in *2021 IEEE Conference on Games (CoG)*, IEEE, 2021, pp. 1–8.
- C-20. T. Li, K. Douglas, H. P. Le, **A. K. Raz**, W. J. Huang, and A. W. Fentiman, "Applying social constructivism in model-based systems engineering online instructional module for engineering professionals," in *2020 IEEE Frontiers in Education Conference (FIE)*, IEEE, 2020, pp. 1–5.
- C-21. C. Guariniello, L. Mockus, **A. K. Raz**, and D. A. DeLaurentis, "Towards intelligent architecting of aerospace system-of-systems: Part II," in *2020 IEEE Aerospace Conference*, IEEE, 2020, pp. 1–9.
- C-22. A. Fentiman, J. Sutherland, D. DeLaurentis, K. Douglas, J. D. Camba, C. R. Kenley, **A. K. Raz**, A. Koehler, W. Huang, A. Hurt, and J. Richardson, "Development, Deployment, and Evaluation of Instructional Modules for Current and Future Practitioners of Model-Based Systems Engineering," in *2020 ASEE Annual Conference Proceedings*, 2020.
- C-23. **A. K. Raz** and C. R. Kenley, "Multi-disciplinary perspectives for engineering resilience in systems," in *2019 IEEE International Conference on Systems, Man and Cybernetics (SMC)*, IEEE, 2019, pp. 761–766.
- C-24. C. Guariniello, **A. K. Raz**, L. Mockus, and D. DeLaurentis, "Experiences in evolving system-of-systems engineering methodology to address pain points," in *2019 14th Annual Conference System of Systems Engineering (SoSE)*, IEEE, 2019, pp. 189–194.
- C-25. C. Guariniello, L. Mockus, **A. K. Raz**, and D. A. DeLaurentis, "Towards intelligent architecting of aerospace system-of-systems," in *2019 IEEE Aerospace Conference*, IEEE, 2019, pp. 1–11.
- C-26. A. Guerrero de la Peña N. Davendralingam, **A. K. Raz**, D. DeLaurentis, G. Shaver, V. Sujan, N. Jain, "Modeling the Combined Effect of Powertrain Options and Autonomous Technology on Vehicle Adoption and Utilization by Line-haul Fleets," in *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, IEEE, 2019, pp. 1231–1238.
- C-27. E. P. Blasch, U. Majumder, T. Rovito, and **A. K. Raz**, "Artificial Intelligence in Use by Multimodal Fusion," in *2019 22th International Conference on Information Fusion (FUSION)*, IEEE, 2019, pp. 1–8.
- C-28. **A. K. Raz**, P. Wood, L. Mockus, D. A. DeLaurentis, and J. Llinas, "Identifying interactions for information fusion system design using machine learning techniques," in *2018 21st International Conference on Information Fusion (FUSION)*, IEEE, 2018, pp. 226–233.
- C-29. A. Guerrero de la Peña N. Davendralingam, **A. K. Raz**, D. DeLaurentis, G. Shaver, V. Sujan, N. Jain, "Modeling Freight Transportation as a System-of-Systems to Determine Adoption of Emerging Vehicle Technologies," in *International Conference on Transportation and Development 2018*, American Society of Civil Engineers Reston, VA, 2018, pp. 156–169.
- C-30. A. Maheshwari, **A. K. Raz**, A. Dervisevic, R. Campbell, D. A. DeLaurentis, W. Colligan, A. Murphy, and O. Kolawole, "Minimum SysML Representations to Enable Rapid Evaluation using Agent-Based Simulation," in *INCOSE International Symposium*, 2018, pp. 1706–1719.
- C-31. E. Blasch, R. Cruise, S. Natarajan, **A. K. Raz**, and T. Kelly, "Control diffusion of information collection for situation understanding using Boosting MLNs," in *2018 21st International Conference on Information Fusion (FUSION)*, IEEE, 2018, pp. 1–8.
- C-32. **A. K. Raz** and D. A. DeLaurentis, "Information Fusion System design space characterization by Design of Experiments," in *2016 19th International Conference on Information Fusion (FUSION)*, IEEE, 2016, pp. 2147–2154.

- C-33. **A. K. Raz** and D. A. DeLaurentis, "Performance evaluation of distributed Track-to-Track fusion systems," in *2014 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, IEEE, 2014, pp. 1585–1590.

Non-Refereed Conference Papers

- NR-1. **B. Prigg**, **A. K. Raz**, and Alexandre D. Barreto. "Cybersecurity Threat Analysis of a Free-Space Optical Communication System Through Model-Based Systems Engineering." *AIAA SCITECH 2026 Forum*. 2026.
- NR-2. **C. Vaseghi**, V. Omelko, R. Hilliard, D. Maxwell, and **A. K. Raz**, "Distributed Command and Control Systems with Intent-Based Networking: Effectiveness and Evaluation." *AIAA SCITECH 2026 Forum*, 2026.
- NR-3. **S. Khatouri**, **F. Sahebsara**, M. Hieb, and **A.K. Raz**, "From Physical Realm to Digital Twin: An Additive Manufacturing Approach to Digital Twin Testbed Development." In *AIAA SCITECH 2026 Forum*, 2026.
- NR-4. **A. Talukder**, S. Alam, R. Hilliard, V. Omelko, D. Maxwell, and **A. K. Raz**. "Distributed Command and Control Systems with Intent-based Networking: Mission Path Formation." In *AIAA SCITECH 2026 Forum*, 2026.
- NR-5. **F. Sahebsara**, **S. Khatouri**, D. Aziz, **O. Zeki**, M. Hieb, and **A. K. Raz**. "The Cornerstone of Digital Engineering: Harnessing Model-based Systems Engineering for Future Systems." In *AIAA SCITECH 2026 Forum*, 2026.
- NR-6. **B. Prigg** and **A. K. Raz**, "Link Analysis of Hybrid Free Space Optics and RF Communications via Model-based Systems Engineering." In *AIAA SCITECH 2024 Forum* (p. 1055). Orlando, FL, 2024
- NR-7. **A. K. Raz**, M. Hieb, J. Ferrari, L. Sherry, and P. Costa, "Exploiting Information Fusion for Cybersecurity of Small Unmanned Aerial Vehicles," in *AIAA SCITECH 2023 Forum*, 2023, p. 2582.
- NR-8. W. C. Levin, S. M. Nolan, **A. K. Raz**, K. Ezra, J. J. Parish, and K. Williams, "Motion-Primitive based Deep Reinforcement Learning for High Speed Aerospace Vehicle Missions," in *AIAA SCITECH 2023 Forum*, 2023, p. 2667.
- NR-9. J. Llinas, C. Bowman, and **A. K. Raz**, "Evolving Towards a Reference Architecture for Data Fusion," in *AIAA SCITECH 2022 Forum*, 2022, p. 0995.
- NR-10. B. Smith, E. Sitchin, **A. K. Raz**, D. DeLaurentis, and W. Stahlschmidt, "Modeling Hypersonic Vehicle Interdependencies at the Subsystem Level," in *AIAA Aviation 2021 Forum*, 2021, p. 2456.
- NR-11. E. Blasch, **A. K. Raz** and R. Sabatini, "Information fusion as an autonomy enabler for uav traffic management," in *AIAA Scitech 2021 Forum*, 2021, p. 0658.
- NR-12. **A. K. Raz**, E. P. Blasch, C. Guariniello, and Z. T. Mian, "An overview of systems engineering challenges for designing ai-enabled aerospace systems," in *AIAA Scitech 2021 Forum*, 2021, p. 0564.
- NR-13. J. Llinas C. Bowman, **A. K. Raz**, N. Thomas, T. Denniston and J. Fiedler, "Fusion Technology and Systems Design Challenges for the Counter-Small UAS Threat," in *National Symposium on Sensor and Data Fusion (NSSDF)*, 2021.
- NR-14. **A. K. Raz**, P. Balasubramani, S. Harrington, C. Guariniello, and D. A. DeLaurentis, "System-of-Systems Acquisition Analytics Using Machine Learning Techniques," 2020.
- NR-15. **A. K. Raz**, E. Blasch, R. Cruise, and S. Natarajan, "Enabling Autonomy in Command and Control via Game-Theoretic Models and Machine Learning with a Systems Perspective," in *AIAA Scitech 2019 Forum*, 2019, p. 0381.
- NR-16. A. Maheshwari, N. Davendralingam, **A. K. Raz**, and D. A. DeLaurentis, "Developing Model-Based Systems Engineering Artifacts for Legacy Systems," in *2018 AIAA Aerospace Sciences Meeting*, 2018, p. 1213.
- NR-17. **A. K. Raz** and D. A. DeLaurentis, "System-of-Systems Architecture Metrics for Information Fusion: A Network Theoretic Formulation," in *AIAA Information Systems-AIAA Infotech @ Aerospace*, AIAA SciTech Forum, 2017.
- NR-18. **A. K. Raz** and D. A. DeLaurentis, "A system-of-systems perspective on information fusion systems: architecture representation and evaluation," in *AIAA Infotech@ Aerospace*, 2015, p. 0644