Dr. Ali K. Raz

(480)-285-6624 araz@gmu.edu www.linkedin.com/in/akraz

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: $3,508,291 **My Share: $1,875,297**

PI-Share: $1,692,655

Co-PI Share: $182,642

1. **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)

2. **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)

3. **Integrated Photonics for Sustained Operations**
   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)

4. **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

5. **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

6. **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

7. **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)

8. **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

9. **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

10. **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)

11. **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

12. **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)

13. **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

- Systems Engineering Best Journal Paper Award, 2018, 2020
- 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:
  - 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
  - Complex Aerospace Systems Exchange (CASE) Scholar on AI, AIAA SciTech 2020
  - United Nations Disarmament Research Institute, Washington D.C., 2019
- Government Agencies/Research Laboratories:
  - Sandia National Laboratories invited lecture on "Introduction to Autonomous Mission Execution", Summer 2021 *(Invited)*
  - 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) (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) (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 Spring 2025)*

- **Student Mentoring at George Mason University**
  - Doctoral Students as Thesis Advisor
    - *i.* Mohammadreza Torakjazi *(3rd year, Proposal Defense in Spring 2024)*
    - ii. Brooke Prigg *(1st year)*
    - iii. Bahador Dodge *(Joining Spring 2024)*
  - Doctoral Students as Committee Member
    - i. Busra Ozoglu *(Graduated Fall 2023)*
  - Master Students
    - i. Mohammed Bhuiyan *(Graduated)*
    - ii. Brooke Prigg *(Graduated, now doctoral student)*
    - iii. Michael Riggi
  - Undergraduate Students
    - i. Markus Garretson
    - ii. Dyar Aziz
    - iii. Brandt Sandman
    - iv. Darius Jack
    - v. Carolyn Vaseghi
    - 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 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 Research Faculty, 2021
    - Search Committee Member for Tenure Track Faculty, 2022-2023
    - SEOR Colloquium Committee Member, 2021,2022, and Spring 2023
- Appointment to Advisory Boards
    - Mathworks MATLAB Sensor Fusion Advisory Board Member, 2022-2023
    - Dassault Systemes Academic Advisory Board Member for Model-based Systems Engineering (MBSE), 2019
- Professional Society Leadership
    - Chair Elect of AIAA Information, Command, and Control Systems Technical Committee
    - Executive Steering Committee Member for AIAA Defense Forum
    - Co-Chair of INCOSE AI Working Group
    - 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 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
- Journal of Sensor and Actuator Networks

Certifications

Certified Systems Engineering Professional - CSEP
International Council on Systems Engineering – INCOSE

Applied Management Principles – Graduate Certificate
Krannert School of Management, Purdue University

Publications

Google Scholar Total Citations: 402 Google Scholar h-index: 12
(as of Jan 2024)

Book Chapters

B-1. 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-2. **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, 2023. *(in publication review)*
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. **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-2. 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 3.441)*
J-3. 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*. *(Revision 1 submitted)*
J-4. **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*. *(Revision 2 submitted)*
J-5. **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*. *(Submitted to DARPA for Public Release Approval)*
J-6. **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 2.0)*
J-7. 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-8. 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-9. **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-10. 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-11. **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. 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-2. 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-3. **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.

C-4. 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-5. 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-6. 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-7. 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-8. 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-9. **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-10. 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-11. 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-12. 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-13. 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-14. 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-15. 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-16. 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-17. **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-18. 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-19. 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-20. 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-21. 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-22. **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-23. 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-24. 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-25. 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-26. **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-27. **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 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-2. **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-3. 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-4. 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-5. 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-6. 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-7. **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-8. 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-9. **A. K. Raz**, P. Balasubramani, S. Harrington, C. Guariniello, and D. A. DeLaurentis, "System-of-Systems Acquisition Analytics Using Machine Learning Techniques," 2020.

NR-10. **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-11. 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-12. **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-13. **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