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Dr. James E. Coolahan
Chief Technology Officer
Coolahan Associates, LLC
3013 Boones Lane
Ellicott City, MD 21042
jim.coolahan@comcast.net
410-440-2425 (cell)



SUMMARY

Dr. James E. Coolahan is the Chief Technology Officer of Coolahan Associates, LLC, having retired from full-time employment at the Johns Hopkins University Applied Physics Laboratory (JHU/APL) in December 2012 after 40 years of service. Within Coolahan Associates, Dr. Coolahan teaches short courses on modeling and simulation (M&S) in systems engineering, and provides consulting services in the U.S. defense industry. He currently chairs the M&S Committee of the Systems Engineering Division of the National Defense Industrial Association, and teaches courses in modeling and simulation for systems engineering in the JHU Engineering for Professionals M.S. program in Systems Engineering, for which he also serves as Partnership Development and Outreach Manager. He holds B.S. and M.S. degrees in aerospace engineering from the University of Notre Dame and the Catholic University of America, respectively, and M.S. and Ph.D. degrees in computer science from JHU and the University of Maryland, respectively. Dr. Coolahan has a technical background in M&S, computer simulation systems/architectures, real-time data acquisition systems, systems and software engineering, aerospace engineering, and missile system test and evaluation (T&E). He has program management experience as a project manager, program manager, and program area manager; line supervisory experience as a group supervisor and a branch supervisor; and corporate staff experience. Dr. Coolahan also served as a member of the National Research Council (NRC) Committee on Modeling and Simulation Enhancements for 21st Century Manufacturing and Acquisition in 2000-2002.

EDUCATION

B.S. Aerospace Engineering (summa cum laude), University of Notre Dame (1971)
M.S. Aerospace Engineering, The Catholic University of America (1975)
M.S. Computer Science, Johns Hopkins University (1980)
Ph.D. Computer Science, University of Maryland (1984)

WORK EXPERIENCE

2013 – present: Consultant
Chief Technology Officer, Coolahan Associates, LLC. Independent consultant for Institute for Defense Analyses (IDA); contributed to Acquisition Model Data study sponsored by the Office of the Secretary of Defense (OSD) (2013-14). Consultant to SimVentions, Inc.; assisting in outreach to government and industry on the Defense M&S Catalog (2015-present). Developer

and instructor for two-day short course, *Modeling and Simulation in the Systems Engineering Process*.

2001 – present: Johns Hopkins University Whiting School, Engineering for Professionals Partnership Development and Outreach Manager, Systems Engineering Program (2012-present); Co-lead for M&S Focus Area in Systems Engineering Program (2008-present). Co-developer and co-instructor for Foundations of Modeling and Simulation in Systems Engineering course (2010-present) and Advanced Systems Modeling and Simulation course (2011-present). Guest Lecturer (systems engineering); presented 1-4 lectures per semester on simulation-based design/acquisition (2001-present).

2008 - 2012: JHU/APL - National Security Studies Fellow, National Security Analysis Department (NSAD)

Member, OSD Dynamic Multi-level Modeling Framework (DMMF) study (2012). Led summer study for APL Executive Council on future options for APL Enterprise Business Support System (EBSS), which resulted in >\$20M overhead cost avoidance over five years (2011). Served as Acting Program Area Manager (PAM) of National Leadership Capability (NLC) Program Area (Jan-Apr 2011).

2004 - 2012: JHU/APL - Program Manager

Manager of M&S tasks for the Defense Modeling and Simulation Coordination Office (M&S CO, formerly DMSO), the Joint Training Integration and Evaluation Center (JTIEC), the Office of Naval Research (ONR), the National Security Agency (NSA), and the Center for Army Analysis (CAA). Technical lead for APL's 5-year Enterprise Validation and Accreditation (EVAC) contract with NSA (2004-2010). Principal Investigator (PI) for grant from the Preparedness and Catastrophic Event Response (PACER) center for the Department of Homeland Security (DHS) (2006-2009), and Project Manager for M&S capability development project for the Defense Threat Reduction Agency (DTRA) (2007-2010).

2001 - 2008: JHU/APL - Supervisor, Modeling and Simulation Group, NSAD

Responsible for line supervision of 20-25 staff members participating in M&S activities. Lead of simulation-related project for the U. S. Army Future Combat Systems (FCS) program (2001-2002), PI for grant from the National Space Biomedical Research Institute (NSBRI) (2000-2004), Member of National Research Council (NRC) Committee on Modeling and Simulation Enhancements for 21st Century Manufacturing and Acquisition (2000-2002).

1996 - 2001: JHU/APL - Assistant to the Director for Modeling and Simulation, Director's Office

Responsible for overall leadership and coordination of emerging Laboratory M&S activities, particularly in the area of Advanced Distributed Simulation (ADS). Responsible for coordination of external interactions on new multi-Department opportunities, and for providing support for Department-led initiatives. Leader of inter-Departmental ADS Team, and chair of Independent Research and Development (IRAD) M&S Thrust Area Panel (1996-2000). Provided technical assistance in 1998-1999 to OSD Simulation Based Acquisition (SBA) Task Force in developing a roadmap and draft implementation plan for the DoD SBA initiative.

1990 - 1996: JHU/APL - Program Area Manager, Space Systems and Technology Applications, Strategic Systems Department

Responsible for overall coordination of seven Department-managed programs in the areas of BMD T&E and systems engineering, Global Positioning System (GPS) applications for BMD intercept testing and for national range uses, automated polygraph scoring technology, and quantum cryptography. Member of Army-sponsored Anti-Tactical Missile (ATM) Program Review Panel (1994-1998).

1985 - 1990: JHU/APL - System Development and Evaluation Branch, Strategic Systems Department

Branch Supervisor (1988 - 1990)

Assistant Branch Supervisor (1985 - 1988)

Responsible for line supervision of three-group branch (approximately 80 staff members). Branch activities included the development of submarine-mounted sensor data acquisition, processing, and display systems for Naval Intelligence; development of instrumentation and recording systems for U. S. Navy Trident sonar systems; and evaluation of Trident sonar data recorded during operations and exercises.

1985 - 1992 JHU G.W.C. Whiting School of Engineering Part-Time Program

Lecturer (computer science), Johns Hopkins University G.W.C. Whiting School of Engineering Part-Time Program (1985-1987); Computer Science Program Committee (1988-1992)

1976 - 1990: JHU/APL - Ocean Data Acquisition Program (ODAP) Office

Program Manager (1982 - 1990)

Group Supervisor (1982 - 1985)

Assistant Program Manager (1981 - 1982)

Overall responsibility for the design, development, installation and testing of five submarine-mounted sensor data acquisition, processing, and display systems for Naval Intelligence. Installations required the development of specially-configured sensor systems, real-time computer system hardware and software, operator display consoles, navigation and system operation procedures; NAVSEA installation approval; training of Navy operators and maintenance technicians; and post-test data evaluation and reporting. Led feasibility study, conceptual design, and system design effort for initial Project Seagate system (\$10M development effort over one year). Responsible for line supervision of approximately 20 technical professional staff members.

Section Supervisor, ODAP Data Acquisition and Processing Section (1977 - 1981)

Responsible for line supervision of four technical professionals. Computer system manager for PDP-11/55 computer system; developed data processing software. Proposed and led the development of three submarine-mounted real-time data acquisition systems based on commercial-off-the-shelf (COTS) technology. Designed and coded real-time software in FORTRAN.

Engineer / Associate Engineer, ODAP Office (1976 - 1977)

Planned data processing for new APL-developed submarine-mounted data acquisition system.
Operated data acquisition system as civilian submarine rider during three-month at-sea test.

1972 - 1976: JHU/APL - Pershing Program Office

Associate Engineer

Responsible for computer data processing and Pershing missile flight test evaluation. Developed computer software in PL/I to reduce and display digital telemetry data; developed system survivability and weapon damage assessment simulation software. Assisted in annual Pershing system performance evaluation, with concentration in missile subsystem evaluation area.

SKILLS AND CAPABILITIES

Extensive experience in project, program, and program area management; program development and planning; line organization supervision; quality management in accordance with ISO-9001 guidelines; and system design and development. Technical capabilities in computer science, computer programming, software engineering, real-time systems, modeling and simulation, and test and evaluation. Working knowledge of personal computer software applications, including Microsoft Word, Excel, PowerPoint, Access, Visio, and Project.

MAJOR PUBLICATIONS

Coolahan, J. E., *The Specification of Timing Requirements for Real-Time Systems Using Timed Petri Nets*, Ph.D. dissertation, University of Maryland, 1984.

Coolahan, J. E., and Roussopolous, N., "Timing Requirements for Time-Driven Systems Using Augmented Petri Nets," *IEEE Trans. Software Eng.* SE-9, pp. 603-616, 1983; also in *Tutorial: Hard Real-Time Systems*, IEEE Computer Society Press, pp. 78-91, 1988.

Coolahan, J. E., Case, F. T., and Hartnett, R. J., "The Joint Strike Fighter (JSF) Strike Warfare Collaborative Environment (SWCE)," in *Proc., 2000 Fall Simulation Interoperability Workshop*, CD-ROM, Orlando, FL (Sep 2000).

Castro, P. E., Antonsson, E., Clements, D. T., Coolahan, J. E., Ho, Y., Horter, M. A., Khosla, P. K., Lee, J., Mitchiner, J. L., Petty, M. D., Starr, S., Wu, C. L., and Zeigler, B. P., *Modeling and Simulation in Manufacturing and Defense Systems Acquisition: Pathways to Success*, Report of the Committee on Modeling and Simulation Enhancements for 21st Century Manufacturing and Acquisition, National Research Council, Washington, DC (2002).

Coolahan, J. E., Feldman, A. B., and Murphy, S. P., "An Interdisciplinary Approach to Integrated Modeling of Human Systems for Spaceflight," in *Proc., Second Joint Meeting of the IEEE Engineering in Medicine and Biology Society and the Biomedical Engineering Society (EMBS/BMES)*, CD-ROM, Houston, TX (Oct 2002).

Coolahan, J. E., "Modeling and Simulation at APL," *Johns Hopkins APL Tech. Dig.* **24**(1), 63-74 (2003).

Coolahan, J. E., Feldman, A. B., and Murphy, S. P., "Integrated Physiological Simulation of an Astronaut Exercise Protocol," in *Proc., 55th International Astronautical Conference*, Vancouver, Canada (Oct 2004).

Coolahan, J. E., Feldman, A. B., and Murphy, S. P., "Simulation of Integrated Physiology Based on an Astronaut Exercise Protocol," *Johns Hopkins APL Tech. Dig.* **25**(3), 201-213 (2004).

Coolahan, J. E., "A Vision for Modeling and Simulation at APL," *Johns Hopkins APL Tech. Dig.* **26**(4), 414-420 (2005).

Coolahan, J. E., "Planning for an Integrated M&S Framework for Catastrophic Event Response," in *Proc., 2007 Spring Simulation Interoperability Workshop*, Norfolk, VA (Mar 2007).

Coolahan, J. E., Kane, M. T., Schloman, J. F. (and six non-APL authors), "Design of an Urban Chemical Disaster Simulation Federation for Preparedness and Response," in *Proc., 2007 Fall Simulation Interoperability Workshop*, Orlando, FL (Sep 2007).

Coolahan, J. E., Kane, M. T., Koomullil, R. P., Kaisar, E. I., and Walsh, K. K., "Results of a Federated Simulation of Urban Chemical Disaster Response," in *Proc., 2008 Interservice/Industry Training, Simulation and Education Conference*, Orlando, FL (Dec 2008).

Coolahan, J. E., Kane, M. T., Morse, K. L., Schloman, J. F., Koomullil, R. P., Shih, A. M., Kaisar, E. I., and Walsh, K. K., "Design of a Bioterrorism Crisis Management Simulation for Preparedness and Response," in *Proc., 2009 Spring Simulation Interoperability Workshop*, San Diego, CA (Mar 2009).

Coolahan, J. E., Morse, K. L., and Kaisar, E. I., "Modeling the Relationships Between Hospital Surge Capacity and Dynamic Traffic Conditions," in *Proc., 2009 European Simulation Interoperability Workshop*, Istanbul, Turkey (Jul 2009).

Coolahan, J. E., Morse, K. L., Saunders, R., Kay, S. W., and Erdman, C. L., "Management Concepts for Broadly-Needed M&S Tools – An In-Progress Study," in *Proc., 2009 Fall Simulation Interoperability Workshop*, Orlando, FL (Sep 2009).

Coolahan, J. E., Kane, M. T., Morse, K. L., Koomullil, R. P., Shih, A. M., Kaisar, E. I., and Walsh, K. K., "Results of a Simulation of Response to a Bioterrorism Crisis," in *Proc., Interservice/Industry Training, Simulation and Education Conference (I/ITSEC)*, Orlando, FL (Nov-Dec 2009).

Coolahan, J. E., Morse, K. L., Saunders, R., Kay, S. W., and Erdman, C. L., "Results of a Study on Management Concepts for Broadly-Needed M&S Tools," in *Proc., 2010 Fall Simulation Interoperability Workshop*, Orlando, FL (Sep 2010).

Coolahan, J. E., Tutorial: "An Introduction to the Use of Modeling and Simulation Throughout the Systems Engineering Process," 13th/14th/15th Annual NDIA Systems Engineering Conference, San Diego, CA (Oct 2010/2011/2012).

Coolahan, J. E., and Allen, G. W., "LVC Architecture Roadmap Implementation – Results of the First Two Years," in Proc., 2011 Fall Simulation Interoperability Workshop, Orlando, FL (Sep 2011). [selected as best paper at conference]

Coolahan, J. E., Numrich, S. K., Richbourg, R. F., et al, Tutorial: "Fundamentals of Modeling and Simulation," in Proc., 2011-2015 Interservice/Industry Training, Simulation & Education Conference, Orlando, FL (Nov 2011, Dec 2012, Dec 2013, Dec 2014, Nov 2015).

Coolahan, J. E., Tutorial: "An Introduction to the Use of Modeling and Simulation Throughout the System Life Cycle," 80th Military Operations Research Society Symposium, Colorado Springs, CO (Jun 2012).

Coolahan, J. E., "Sustainment of Modeling and Simulation Tools in the Defense Environment," in Proc., 2012 Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL (Dec 2012).

Coolahan, J. E., "Toward a Taxonomy for Data Used in Acquisition-Related Models and Simulations," in Proc., 2014 Fall Simulation Interoperability Workshop, Orlando, FL (Sep 2014).

Coolahan, J. E., Short Course: "Modeling and Simulation in the Systems Engineering Process," Coolahan Associates, LLC, Ellicott City, MD (May 2015).

Coolahan, J. E., and Bergenthal, J. J., "A System-Model-Centric Collaborative Environment for the Acquisition Lifecycle," in Proc., 2015 Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando, FL (Nov-Dec 2015).

HONORS

Dean's Lists, University of Notre Dame, 1967 - 1971

Tau Beta Pi (engineering honor fraternity), inducted 1969

Steiner Prize for Excellence in Engineering, University of Notre Dame, 1971

AIAA Student Award, University of Notre Dame, 1971

National Science Foundation Fellowship, The Catholic University of America, 1971 - 1972

Marquis Who's Who in the East, 24th ed., 1992

Award of the Year, Notre Dame Alumni Club of Maryland, 1993, 2003

Meritorious Service Award, Simulation Interoperability Standards Organization, 2014

PROFESSIONAL SOCIETY MEMBERSHIP

American Institute of Aeronautics and Astronautics (AIAA) (1969 - 1974 and 1991 - present)

Institute of Electrical and Electronics Engineers (IEEE) and IEEE Computer Society (1982 - present); Chairman, Baltimore Chapter, IEEE Computer Society (1984 - 1986)

National Defense Industrial Association (NDIA) (1992 - present); Chair, NDIA Systems Engineering Division Modeling and Simulation Committee (2009 - present); M&S track

chair for NDIA Systems Engineering Conference (2009 - present); Technical Program Chair for NDIA Physics-Based Modeling Conference (2011)
National Training and Simulation Association (NTSA) Interservice/Industry Training, Simulation & Education Conference, Member of Tutorial Board (2009 - present)
Association for Computing Machinery (1982 - 1991)
Simulation Interoperability Standards Organization (1996 - present); Secretary, Conference Committee (2008 - 2012); Vice-Chair, Executive Committee (2012 - 2015); Secretary, Board of Directors (2012 - 2013); Treasurer, Board of Directors (2013 - 2015); President (2015 - present)

SECURITY CLEARANCE

Secret - 1972 to 1976; 2013 to present; Top Secret - 1976 to 2013.