

**Curriculum Vitae**  
**Dr. C. Robert Kenley**  
Kenley Consulting, LLC  
916 IVY CREEK COVE  
FORT WAYNE, IN 46804-3582  
(260) 460-0054  
[bob.kenley@kenley.org](mailto:bob.kenley@kenley.org)

**EDUCATION**

6/81 - 6/86      Ph.D., Engineering-Economic Systems (EES), Stanford University  
9/79 - 1/84      M.S., EES, Stanford University  
8/77 - 8/79      M.S., Statistics, Purdue University  
9/71 - 6/75      S.B., Management, Massachusetts Institute of Technology

**PROFESSIONAL  
EXPERIENCE**

8/98 – Present      KENLEY CONSULTING, LLC  
Consultant.

**Applications Experience:** For ITT Industries, developing methods for technology readiness assessment, R&D portfolio evaluation, and development cost uncertainty analysis to establish a comprehensive, integrated decision support process.

For the Idaho National Lab and the US Army, providing technical expertise and leadership on trade study methods for R&D planning.

For Lockheed Martin, applying advanced Bayes net and influence diagram algorithms to missile defense target discrimination that fuses passive and active sensor data.

For Department of Energy (Bechtel SAIC), providing economics and uncertainty modeling support for the Yucca Mountain Radioactive Waste Management System. Developing appropriate methods for financial discounting and treatment of engineering cost uncertainties for a project that spans multiple generations over a period of several hundred years. Integrating programmatic and technical risk assessment into life cycle cost uncertainty modeling.

For Department of Energy (Bechtel BWXT), developed multivariate regression methodology to integrate diverse inputs data sets on job creation in the US resulting from deployment of the next generation of nuclear power plants.

For National Nuclear Security Administration, led technology readiness evaluation for Los Alamos National Laboratory Pit Disassembly and Conversion technologies to define prioritize R&D investments.

For Spectrum Astro and Lockheed Martin, provided system-of-systems requirements development, technical integration and risk management expertise for the SBIRS High and Low satellite constellations. Multiple

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end users are provided data that is collected from multiple electro-optical sensors and is processed and distributed using a complex network architecture.

For Department of Energy (Bechtel BWXT), developed a Mutli-Year Program Plan for R&D responding to DOE requirements for the Nuclear Materials Focus Area. Provided strategic planning decision analysis support and management support to develop and execute plans to transition excess defense nuclear materials to civilian uses such as medical isotope and advanced commercial reactor fuel production.

For Boeing North American, provided technical and management closure on design requirements for a complex infrared data collection and data processing payload.

**Research Accomplishments:** For Department of Energy (Bechtel SAIC), developed a system life cycle cost risk assessment methodology that combines standard cost risk Monte Carlo modeling and subjective risk assessment methods based on system cost overruns that used Defense Department major procurement historical data.

For Lockheed Martin, developed a new implementation of mixed Gaussian Bayes nets that provides numerical stability for real-time applications such as target tracking, typing, and discrimination, and incorporates deterministic models and diffuse prior information.

Lockheed Martin has filed a patent application for this invention.

For Department of Energy (Bechtel SAIC), developed a forecasting model that uses commercial bond forward yields for long-term inflation and interest rates. Kenley Consulting has filed for a patent on this invention.

For Department of Energy (Bechtel SAIC), integrated 55 years of economic research on long-term discounting theory to provide a cogent explanation and evaluation of the different models and provided a recommendation for the appropriate long-term discounting methodology to be applied to federal procurements that is being reviewed by the US Office of Management and Budget.

6/99 - present

**Service Accomplishments:** Serving as chair of Ways and Means of the International Council on Systems Engineering, attended all meetings of the Board of Directors and led them through major policy and bylaws changes to effect significant changes in the governance structure of this growing international professional society.

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1/99 - 3/99      **Teaching Experience:** Taught project management at San Jose State and probability at UC Davis (Livermore extension). These were at the upper division undergraduate / lower division graduate level.

5/95 – 8/98      **LOCKHEED MARTIN IDAHO TECHNOLOGIES COMPANY**  
Engineering Fellow in Systems Engineering.

**Applications Experience:** On loan to Lockheed Martin Missiles & Space (LMMS) in Sunnyvale, CA, I organized and managed activities to migrate the space vehicle requirements and verification responsibility from Boeing to LMMS. The accomplishments in this four-month period included review of existing documentation, preparing a credible presentation for a major program review, and laying out detailed closure plans. At Department of Energy headquarters in Washington, DC, provided DOE Office of Science and Technology Policy with expertise in systems processes and portfolio analysis methodologies to select R&D investments. Provided systems engineering leadership for the Nuclear Materials Stabilization Task Group’s Technical Advisory Panel of plutonium and uranium processing experts that evaluated programmatic risk and prioritized approximately 100 technologies offered by production sites and labs across the DOE complex for a high-priority, fast-paced nuclear waste disposal program. Presented results of the findings to DOE senior executives and the Defense Nuclear Facilities Safety Board. Provided systems engineering leadership for the Plutonium Stabilization and Packaging System Procurement, a unique performance-based central procurement.

**Research Accomplishments:** Developed a technology maturity and programmatic schedule risk assessment methodology that provides a quantitative ranking for progress evaluation and decision making. The process produces rankings that are correlated to the actual time remaining to achieve operational readiness. This enables operational readiness forecasting for planners and policy makers for time-critical missions.

**Teaching Experience:** Taught systems engineering trainees in Idaho and via video-teleconferencing to retrain scientists and engineers for the future role of the Idaho National Environment and Engineering Laboratory as the “Center of Excellence” for DOE systems engineering. This training is at the upper division undergraduate / lower division graduate level.

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3/89 - 4/95  
11/92 - 4/95

LOCKHEED MISSILES & SPACE COMPANY, INC.  
Lead, Systems Analysis. DMSP/NOAA, Space Systems Division (SSD).

**Applications Experience:** Developed plan to focus Lockheed and customer activities in support of the government's acquisition decision in concert with DoD 5000 acquisition instructions. Developed operations modeling and quantitative cost-effectiveness analysis capability for a front-end systems engineering effort to define concepts for merging the Defense and Commerce low altitude environmental satellite systems into one system used advanced sensor and data processing technology.

**Research Accomplishments:** Developed original results to quantify impacts of sensor and design engineering decisions on end-user operational effectiveness.

**Teaching Experience:** During my tenure at Lockheed Missiles & Space, I taught systems engineering training classes on system simulation and system synthesis, and overviews of decision analysis and the systems engineering process. This training also was at the upper division undergraduate / lower division graduate level.

11/92 - 3/94

Group Lead, Communication Operations. Milstar, SSD.

**Applications Experience:** Organized and recruited personnel for group to meet needs for advanced development to support previously undefined needs for a multi-billion dollar space program. Supervised on-orbit test and independent operational evaluation of the system against user needs. Developed communications satellite system operations and use concept. Project Lead for Milstar Polar Adjunct Study, which included leadership of activities as diverse as system requirements development; system, spacecraft, and ground segment design trades; subcontractor payload design; and life cycle costing.

4/91 - 11/92

Sr. Staff Engineer. FEWS, ATSSB, Brilliant Eyes, and P-477; SSD.

**Applications Experience:** Led System Maturity Risk Management Plan for FEWS satellite system proposal. On P-477, performed complex signal and data processing algorithm trades and proposal writing. Managed senior Lockheed staff and technical consultants performing applied research and communicated results to the customer and software subcontractors. Assisted Palo Alto research laboratories in defining

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requirements for advanced development of multi-sensor passive and active acoustic system under DARPA sponsorship.

3/89 - 4/91      Deputy to Chief Systems Engineer. Space Surveillance and Tracking System (SSTS) , Astronautics Division (AD).

**Applications Experience:** Assisted in direction and coordination of technical efforts of a 40-person department at Lockheed, additional system engineering staff at TRW, and design engineers at Hughes, Aerojet, TRW, and Lockheed. Chief technical responsibility was defining system performance requirements for System Design Review of the demonstration and validation satellite.

**Research Accomplishments:** Developed multi-target tracking algorithm based on multivariate Gaussian influence diagram models.

1/88 - 3/89      Sr. Staff Engineer. TIBURON SYSTEMS, INC., San Jose, CA.

**Applications Experience:** Chief Systems Engineer for submarine data processing systems. Developed simulation to define the hardware/software architecture for two submarine combat system contracts.

6/81 - 12/87      LOCKHEED MISSILES & SPACE COMPANY, INC.

1/85 - 12/87      Group Engineer / Analyst. SSTS program, AD.

**Applications Experience:** Systems analysis and simulation supervisor. Integrated efforts from multiple organizations , and developed system utility versus cost trades to determine cost-effective interface solutions.

6/81 - 1/85      Research Engineer. Data Systems Engineering, SSD.

**Applications Experience:** Simulation modeling for real-time distributed ground system with emphasis on designing central man-machine process control algorithms and software requirements. Design, analysis, and implementation of angles-only satellite tracking algorithm for a prototype data fusion system, mission planning algorithm development for a satellite-based radar system, and real-time tactical data systems software development.

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9/80 - 6/81      Teaching Assistant. Engineering-Economic Systems (EES) Department, Stanford University.

**Teaching Experience:** Taught probabilistic analysis, decision analysis, advanced decision analysis, and decision analysis practice.

6/80 - 9/80      Analyst. APPLIED DECISION ANALYSIS, Menlo Park, CA.

**Applications Experience:** Wrote technical appendix for final report on an National Institutes of Health R&D planning model that assessed consumer acceptance of potential cavity prevention treatment products.

8/77 - 8/79      Teaching Assistant. STATISTICS DEPARTMENT, Purdue University.

**Teaching Experience:** Taught calculus and statistics. Responsible for recitations and grading of homework and tests.

## **PUBLICATIONS**

\* Publications in refereed journals are preceded by a single asterisk

\*\* Publications competitively selected at conferences are preceded by a two asterisks

\*\*July 2005      C. Robert Kenley and James H. Nail, "Quantifying Cost Risk Early in the Life Cycle", Proceedings of the 15<sup>th</sup> INCOSE Symposium, Rochester, NY.

\*\*June 2004      C. Robert Kenley, "Requirements Risk Assessment - Integrating QFD and Risk Assessment", Proceedings of the 14<sup>th</sup> INCOSE Symposium, Toulouse, FR.

\*\*June 2004      David J. Paul, William C. Webster, and C. Robert Kenley, "Integrating Systems Engineering and Marketing", Proceedings of the 14<sup>th</sup> INCOSE Symposium, Toulouse, FR.

\*January 2004      C. Robert Kenley and Donald C. Armstead, "Discounting Models for Long-Term Decision Making", Systems Engineering, Vol. 7, pp 13 - 24.

\*December 1999      C. Robert Kenley and Terry R. Creque, "Predicting Technology Operational Availability Using Technical Maturity Assessment", Systems Engineering, pp 198 - 211.

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- \*\*June 1999 David J. Paul and C. Robert Kenley, “System Engineering and Marketing”, Proceedings of the 9<sup>th</sup> INCOSE Symposium, Brighton, UK, pp. 849-854.
- February 1999 Finis Southworth, Bob Seidel, Bill Scott, Kenny Osborne, Terry Creque, Bob Kenley, Nate Chipman, and Dieter Knecht, “A Program to Stabilize Nuclear Materials as Managed by the Plutonium Focus Area”, WM’99 Conference Proceedings, Tuscon, AZ. Paper No. 10-57.
- \*January 1999 C. Robert Kenley and Robert B. Coffman, “The Error Budget Process: An Example from Environmental Remote Sensing”, Systems Engineering, pp. 275-282.
- \*\*July 1998 C. Robert Kenley and Terry R. Creque, “Predicting Technology Operational Availability Using Technical Maturity Assessment”, Proceedings of the 8<sup>th</sup> INCOSE Symposium, Vancouver, BC. pp. 627-633.
- \*January 1999 Keith D. Hutchison, Steve Marusa, John R. Henderson, C. Robert Kenley, William G. Uplinger, and John A. Twomey “Sensor Design Considerations for the Retrieval of Sea Surface Temperatures in the NPOESS Era”, Journal of Atmospheric and Oceanic Technology, pp. 107-116.
- \*\*August 1997 C. Robert Kenley and Alenka Brown-Van Hoozer, “Applying Programmatic Risk Assessment to Nuclear Materials Stabilization R&D Planning”, Proceedings of the 7<sup>th</sup> INCOSE Symposium, Los Angeles, CA. pp. 609-615.
- February 1996 C. Robert Kenley and Bernard R. Kokenge “Integrating Systems Engineering Into Nuclear Materials Stabilization R&D Planning”, presented to American Institute of Engineers Spring National Meeting, New Orleans, LA
- December 1995 Bernard R. Kokenge and C. Robert Kenley, “Integrating Systems Engineering Into Nuclear Materials Stabilization R&D Planning”, presented to the Plutonium Immobilization Workshop, Washington, DC
- \*\*August 1994 C. Robert Kenley, “Principles of Decision Analysis”, Proceedings of the 4<sup>th</sup> NCOSE Symposium, San Jose, California.

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- May 1990 C. Robert Kenley and Thomas R. Casaletto, “Multi-target Tracking Using Influence Diagram Models” in Influence Diagrams, Belief Nets, and Decision Analysis
- \*May 1989 Ross D. Shachter and C. Robert Kenley, “Gaussian Influence Diagrams”, Management Science
- June 1986 C. Robert Kenley, “Influence Diagram Models with Continuous Variables”, Ph.D. Dissertation, Stanford University (available at <http://www.kenley.org>)

**PATENTS / PATENTS PENDING**

- November 2003 Charles Robert Kenley, “A Method to Forecast Returns on Stocks, Bond, Bills, and Inflation Using Corporate Forward Bond Rates”, US Patent Application No. 10/707,114.
- March 2003 Edward A. Larmore, Charles R. Kenley and Michael A. Kovacich, “Mixed Bayesian Network Java Software”, US Provisional Patent Application No. 60/453,030.
- March 2004 Charles R. Kenley and Michael A. Kovacich, “Mixed Bayesian Network”, US Patent Application No. 10/794,781.

**ADDITIONAL  
INFORMATION**

Chair, International Council of Systems Engineering Ways and Means Committee.

Current DOE Q Clearance.

Elder, Presbyterian Church (USA).

Graduate, Lockheed Supervisory Institute, University of Santa Clara Business School.

Coach, Purdue University Lacrosse Club.

President and Chaplain, MIT Chapter of Sigma Alpha Epsilon Fraternity.

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Undergraduate Chair, MIT Open House Committee.

Graduate, Sigma Alpha Epsilon Fraternity National Leadership School.